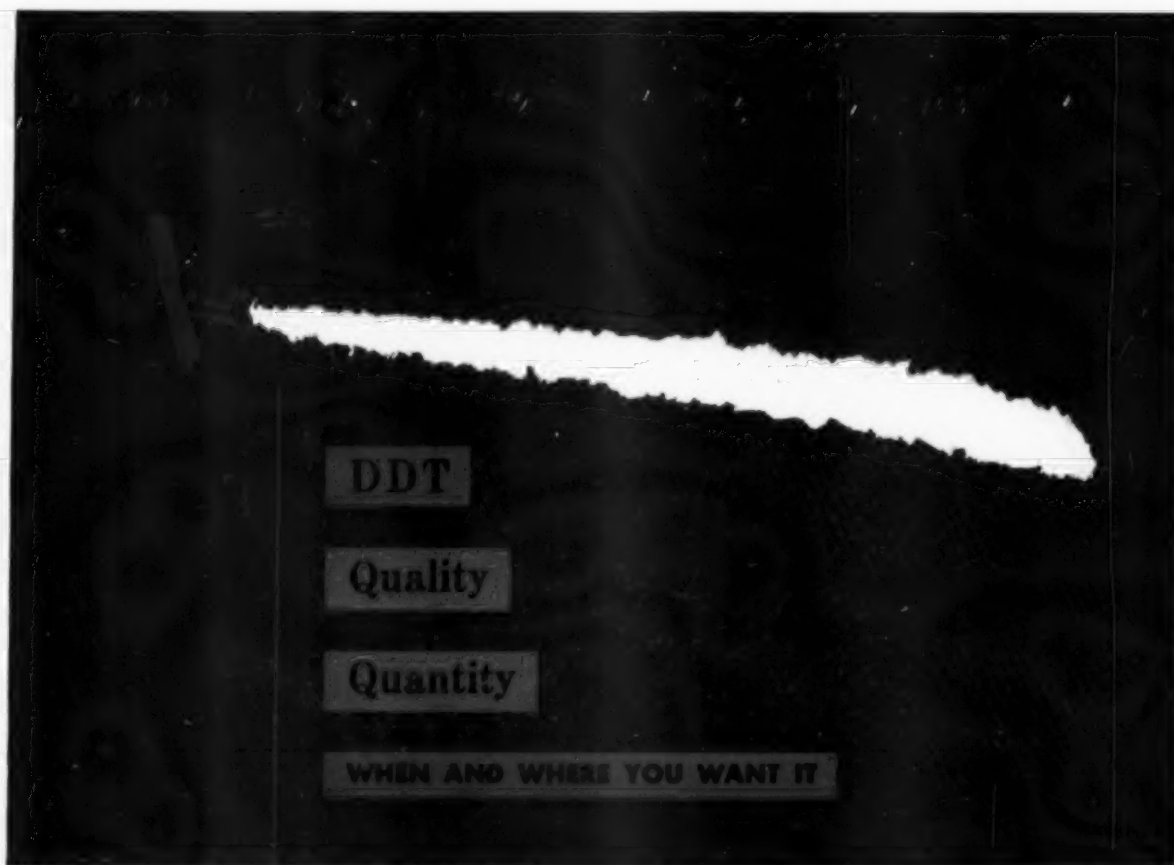


AGRICULTURAL CHEMICALS



In This Issue:

Problems of Pesticide-Fertilizer Mixtures • A.P.F.C. Meeting Report • NAC Assn. Plans 20th Anniversary
Fertilizer Industry Looks Ahead • Pacific Entomologists • NFA in Greenbrier Meeting • New Cotton Defoliant
Rep. Hope Discusses Agricultural Policy • Effect of Soil Conditioners on Yield • G. F. Leonard Retires



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DDT Needs.

Your guarantee of quality and quantity when and where you want it is no better illustrated than in our past performance in meeting the strict, high quality World Health Organization (WHO) specifications on DDT, involving large quantities with rigid delivery schedules.

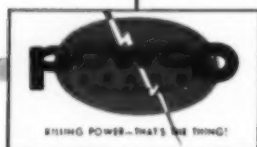
Because of our ability to meet any specifications that require top-notch quality, POWCO BRAND insecticides completely satisfy all your domestic needs as well as diversified international requirements. No matter what the form—Dust Base—Emulsion—or Oil Concentrate—POWCO BRAND Quality DDT is available to you in any formulation—when and where you want it.

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As prime producers of high grade red muriate of potash, we are happy to share in the growth of our agricultural economy.

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REPORTS FROM THE
INDUSTRY ON HOW THIS CARRIER
AND DILUENT HELPS TAKE THE
"MAYBE" OUT OF PESTICIDE
PROCESSING

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ATTAPULGUS carriers for SOIL PESTICIDES

Granular grades have been developed which have formulating and field application characteristics of particular value in soil insect control. Like "thirsty" Attaclay, these commercially-proved granular grades have great sorptive capacity, insuring easy and effective processing. Excellent coverage results are obtained when applied either from the ground or the air. Particle size ranges to suit all formulations. Write for data sheet and free test samples.



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Our suggestion: put Attaclay on your first team and forget flowability-dustability problems. May we work with you?



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ATTAPULGUS Minerals & Chemicals Corporation

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AGRICULTURAL CHEMICALS



**A Monthly Magazine
For the Trade**

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THIS MONTH'S COVER:

Under-Secretary of Agriculture, True D. Morse (center) is pictured with Louis Ware (left), chairman of the board of the National Fertilizer Association and Dr. Russell Coleman, (right) president of the NFA at the group's recent convention at the Greenbrier Hotel, White Sulphur Springs, W. Va. Complete report of meeting on page 44, this issue.

Vol. 8

JULY

No. 7

1953

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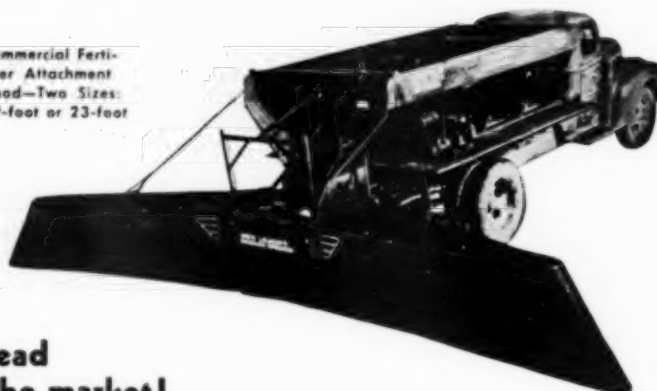
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AGAIN!
"The NEW LEADER"
leads the field

with its new
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offering greater accuracy of spread
with the most positive feed on the market!

Commercial Fertilizer Attachment
Head—Two Sizes:
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SPECIAL ADVANTAGES — Uniformity of spread is not dependent on truck speed. Motor is mounted on catwalk and drives only the twin distributor discs at a constant speed, assuring full width of spread at all times together with uniform distribution.

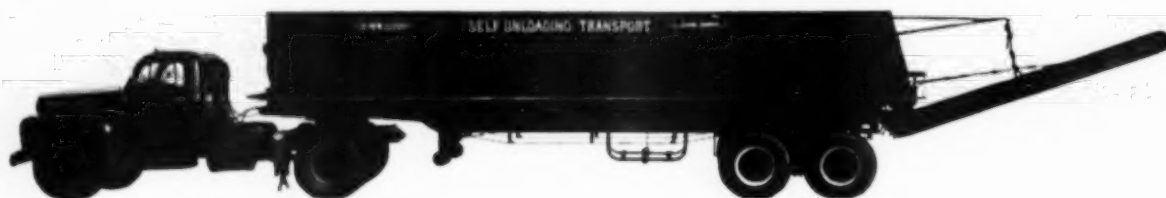
Conveyor is separately driven from truck drive shaft by a series of V-belts to deliver the correct amount per acre—regardless of truck speed or regardless of whether the truck is driven in low, super-low or any other gear.

Conveyor speed is, therefore, positively syn-

chronized with speed of the rear wheels of the truck and at each revolution of the rear wheels, the conveyor moves a given distance regardless of the truck's speed. Amount of material delivered by conveyor does not vary with hilly or soft field conditions.

Spreader Body Lengths (inside measure) are 9', 11', 13' and 15'. Other body lengths on special order.

Note: When Spreading Attachment is folded up for road-traveling position, width is approximately 7'-5".



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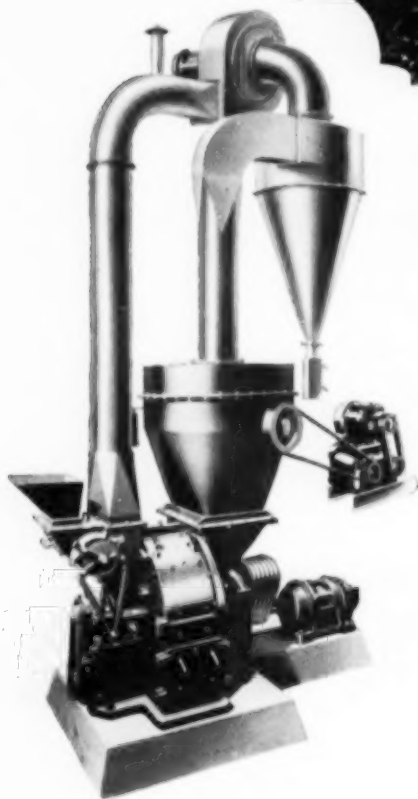
*August, 1951 research study.

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The operating records of many Raymond installations now in use show that Imp Mills are highly efficient units for grinding and intimately blending field strength insecticides. Why these machines deliver finer and more consistent finished products, is due to the special advantages of Raymond design:—

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*For complete details . . . write
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Sul-Po-Mag is produced exclusively by *International* in bulk for mixed fertilizers and bagged for direct application.

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Potash Division

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

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JULY, 1953



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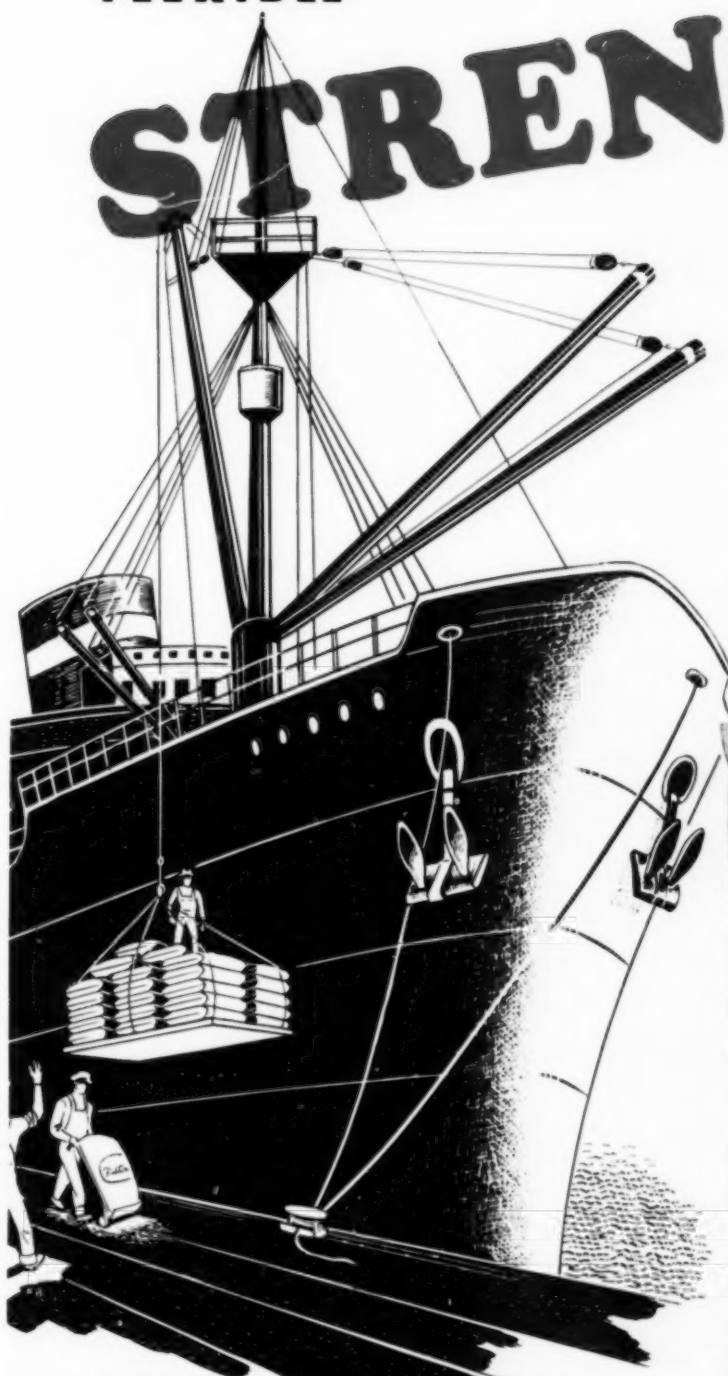
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NEW BULLETIN No. D13, just off the press, explains why DARVAN* is an excellent dispersing and suspending agent for agricultural wettable concentrates.

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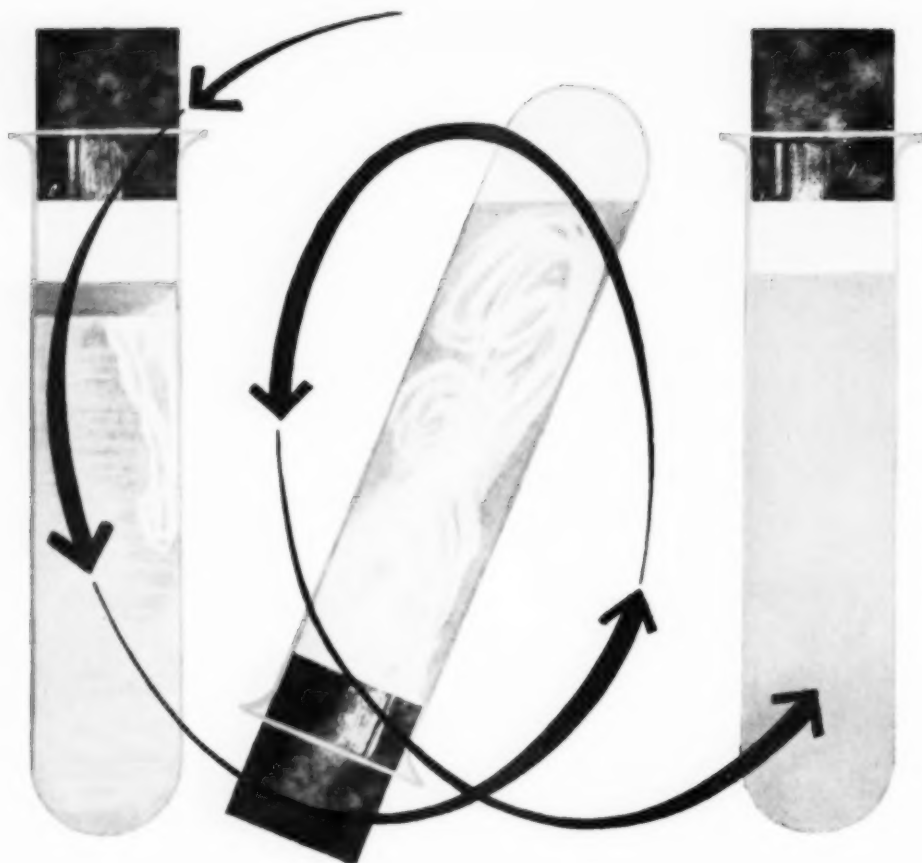
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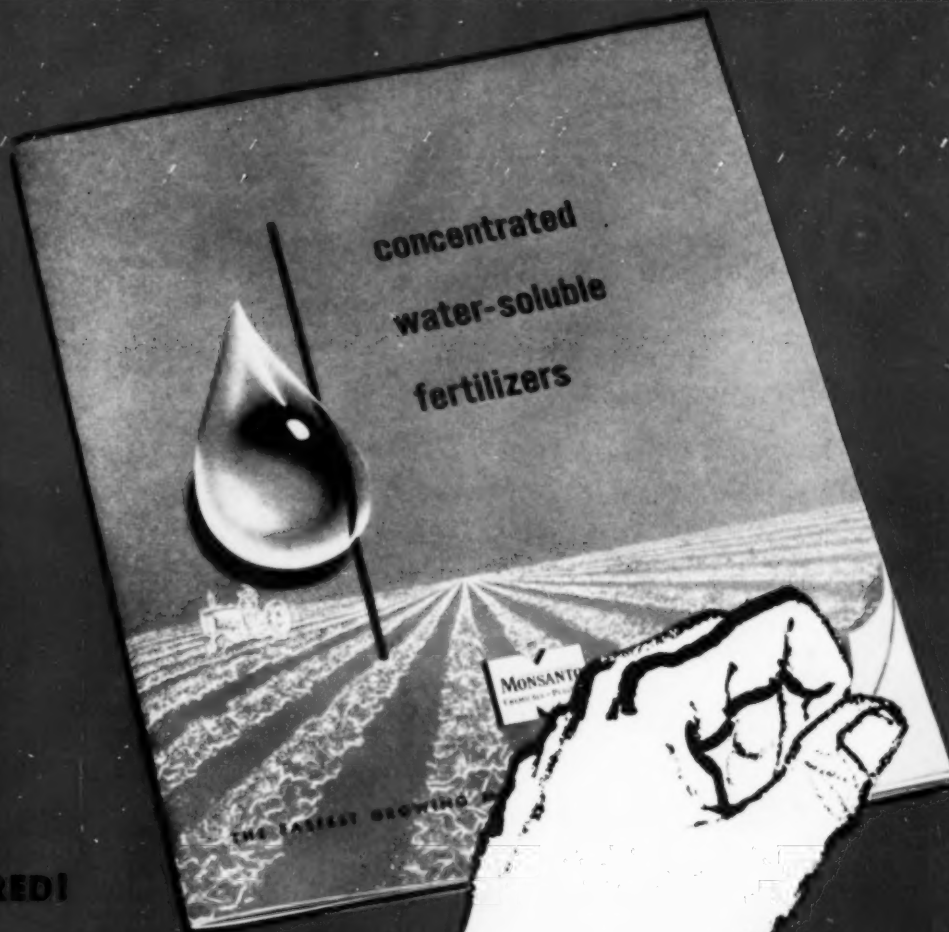
Toxaphene, DDT, chlordane, 2, 4-D—these are only a few of the toxicants that can be emulsified easily and economically with Etho-chemicals. Write today for complete information, including prices and suggested formulations, on our complete line of emulsifiers.



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Penco

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Penco De-Fol-Ate has been developed by Pennsalt to supply a chlorate-type defoliant which is free of boron. Since DE-FOL-ATE is hygroscopic, it picks up moisture from the atmosphere, making it ideally suited for use under climatic conditions usually prevailing at harvest time.

DE-FOL-ATE goes into solution quickly and easily, saving valuable time and insuring that all of the ingredients are thoroughly dissolved before being applied to the cotton. Because it contains a fire suppressant, DE-FOL-ATE does not present the fire hazard normally associated with chlorate-type defoliants.

DE-FOL-ATE, being a chlorate-type defoliant, is dependable; and since it contains no boron can be used on soils which are already high in boron content. It is available in 100-lb. drums.

Pennsalt

ENDOTHAL*

Endothal is a liquid cotton defoliant that causes the cotton plant to shed its leaves earlier and more uniformly. As a result, (1) mature bolls open faster; (2) picking efficiency is increased, both hand and mechanical; (3) fewer pickings are required to clean a field; (4) quality is improved—trash and leaf-stain are reduced; (5) boll rot and insect control are aided.

To the grower this means a saving in time and in labor, as well as better cotton—in short, a more profitable harvest!


Endothal is easy to use, dependable in its action. It mixes easily with water in the spray tank, requires no special equipment. Because it takes effect quickly, rain occurring five or six hours after treatment will not ordinarily interfere with plant response.

Endothal is effective at relatively low-gallon-per-acre rates, and is particularly valuable under certain conditions of plant maturity where defoliants often fail. It is available in handy five-gallon cans and in 54-gallon drums.

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*Endothal (disodium 3,6 endoxohexahydrophthalate) and De-Fol-Ate are trade marks of Pennsylvania Salt Manufacturing Company. The manufacture and use of Endothal as a defoliant and herbicide are covered by one or more of the following U. S. Patents: 2,550,494; 2,576,080; 2,576,081; 2,576,083. Patent pending on DE-FOL-ATE.

Pennsalt makes a complete line of effective cotton insecticides, both dusts and sprays, including BHC, DDT, Aldrin, Calcium Arsenate, Parathion, Toxaphene, and various combinations of these.



**Pennsalt
Chemicals**

Left—untreated onion; Right—treated with MH-40



Naugatuck nips storage growth in bud!

The United States Rubber Company's Naugatuck Chemical Division has good reason to believe it has dealt a death blow to destructive storage growth. The reason is a new Naugatuck chemical—a water soluble salt containing 40% maleic hydrazide and called MH-40.*

Every grower knows the advantage of storing away part of a crop like onions

until the market is more favorable. And every grower also knows the risk involved—namely, the sprouting, shriveling and wrinkling which can make that crop unsalable.

As far back as 1947, Naugatuck's research scientists came up with the first version of MH-40. Since then, working in cooperation with more than 250

experiment stations and other agriculturists, they have discovered hundreds of potential uses for this unique new chemical. One of these uses was for the inhibition of storage growth.

Today MH-40 is commercially available as a grass inhibitor and wild-onion killer. And it won't be long before it will be made available as a storage growth inhibitor, too!

*U. S. Pat. No. 2,614,916

MH-40 is one more example of Naugatuck know-how at work, always striving to introduce new and better products to the agricultural field.



UNITED STATES RUBBER COMPANY

Naugatuck Chemical Division, Naugatuck, Conn.
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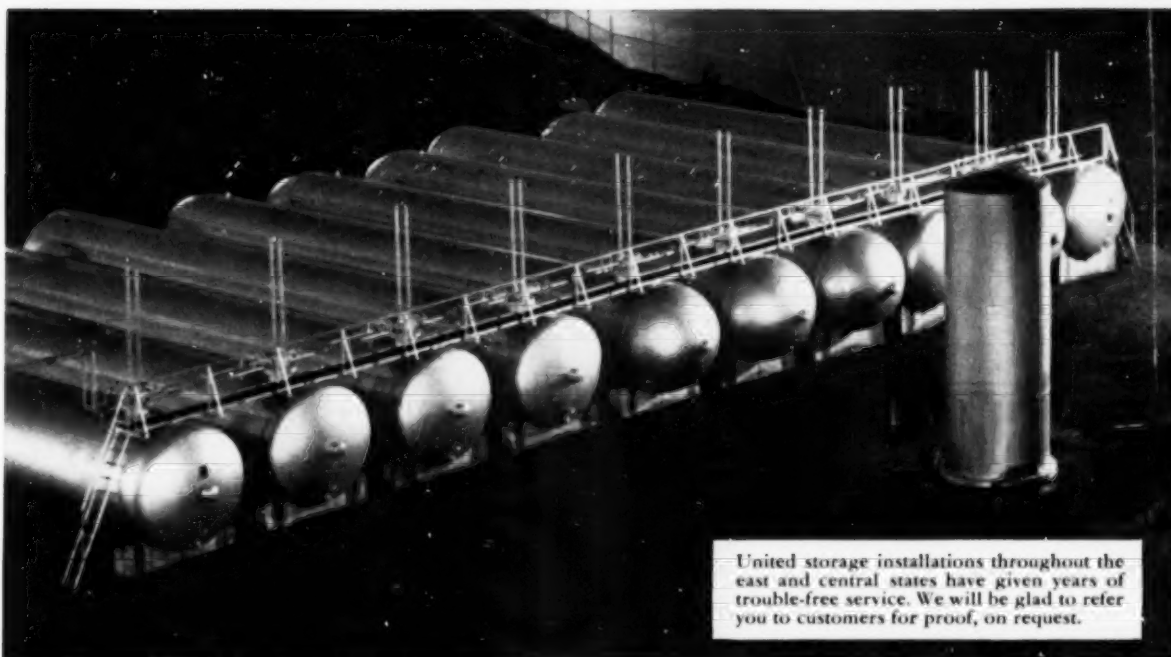
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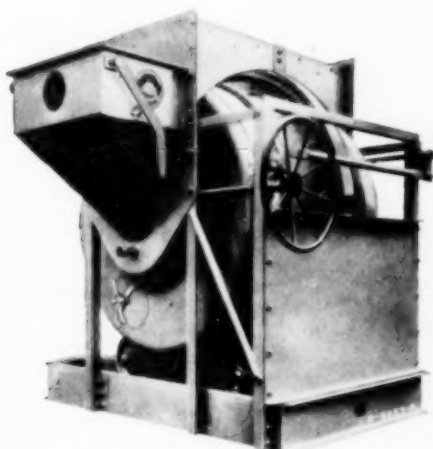
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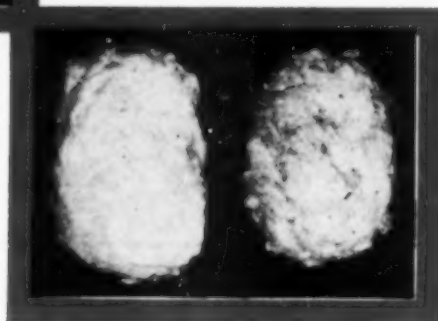


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Editorial COMMENTS

W

HILE some may doubt that any substantial frontiers still exist to bring about significant agricultural progress, well-versed agronomists and other agriculturists are indicating that fertilizer consumption in the United States could be increased greatly by widespread utilization of irrigation systems even in regions where rainfall is more or less plentiful. A panel at the recent meeting of the National Fertilizer Association brought out this point clearly.

One agronomist indicated that if irrigation were installed widely in an area, the colleges would have to double their recommendations for fertilizer use, and actual consumption should be increased some four times. Why? Because supplemental irrigation would increase crop yields to the extent that much more fertilizer would have to be applied to compensate for that which is removed by the greater harvest.

One speaker declared that when a farmer puts supplemental irrigation on a field, he has to start thinking about fertilizer for that field in terms of tons instead of hundred pound bags. That is the angle which looks increasingly interesting to the fertilizer trade.

But before too much excitement is generated by these encouraging facts, one must also take a look at some things to be ironed out before widespread irrigation may be accomplished.

One important point is that of water resources. These include underground water supplies, stored run-off water in ponds and reservoirs, and water from natural streams. Another knotty problem arises from the legal angle involved in the use of water from these natural streams.

A grower may have a nice creek or other stream running through his land, making an ideal source of water for increasing his farm's production. But downstream may be a neighbor, also expecting to make use of the same stream which wanders through *his* property, too. Should the first grower be allowed to capture all of the water, leaving his good neighbor with only a dry ditch? Who is entitled to the water?

If widespread use of fertilizer through irrigation and greater need for additional plant food comes to pass because of this, then the fertilizer industry might do well to encourage growers in their areas to make use of this crop-increasing system.

A

AFTER three years of waiting for pesticide residue tolerances to be issued by the Federal Food and Drug Administration, the trade is reaching the point of real irritation. This annoyance is also shared by major farm organizations which maintain, correctly, that any tolerances changing established farm practice should be announced in time for growers to plan accordingly.

That the same is even more true in the pesticide manufacturing trade is rather obvious. How can producers of insecticides plan very far ahead and provide ample materials for crop protection at the risk of having adverse tolerances set? The grower, likewise is reluctant in some cases, to use adequate amounts of pest control chemicals, fearing that a sudden announcement in mid-season might catch him with too much residue on his harvested crops.

The FDA hearings were completed in 1950. This is the middle of 1953. Why the delay? Why?

Described as a "tide" moving forward, pesticide-fertilizer mixtures are catching on in many parts of the country. What does this mean to the manufacturer? Here are some thought-provoking questions and answers regarding—

FERTILIZER and PESTICIDE MIXTURES

PERHAPS as part of the over-all need to cut production costs or maybe from a desire on the part of farmers to try something new, the trend toward mixing pesticides, particularly insecticides, with fertilizers is quite evident in the trade today. Whether or not such an idea will catch the fancy of both manufacturers and users to a broad extent remains to be seen, but at present, the movement has been described as a "tide"; and its advance in some areas has been considerable.

From the grower's point of view, the advantages of being able to apply both plant food and pest control materials in the same operation are obviously desirable. Savings can be realized in labor, equipment, gasoline and time; and with the farmer caught in the midst of a continuing cost-price squeeze it is understandable that he should grasp at any reasonable-sounding idea to lower his unit cost of production.

By using more fertilizer, he has been told, his unit cost can be reduced substantially. This, he understands. Using the same argument, he can rather easily talk himself into the idea of further savings through the application of two necessities in a single operation instead of in two.

This reasoning, plus prompting in some quarters by extension people, has created the demand which many in the fertilizer and insecticide trade are wondering what to do about. On what basis should a mixer decide whether or not he should give this idea a try? Will sales of both plant food and pest control materials be increased? Could the local market be exploited more successfully with such an offering? What is involved in manufacturing and marketing fertilizer-pesticide mixtures?

Any mixer who has studied the problem objectively and thoroughly has probably discovered a number of factors which give him pause.

From the mixer's standpoint, the problems are numerous, but perhaps not insurmountable. They involve state and federal regulations covering pesticides, labeling, packaging problems, and liability. These are beyond the problems involved in the mixing process itself which presents numerous additional considerations.

How about the matter of compatibility? Chlorinated hydrocarbons, for instance, are compatible with ordinary fertilizer materials when stored at normal temperatures, but all of them (except dieldrin and aldrin) are inactivated by alkalis at ordinary temperatures. At higher temperatures, they are much more easily decomposed or volatilized. When one considers that the temperature of mixed fertilizers may exceed 100° C when ammoniated and that DDT decomposes rapidly at 70° C, it is rather obvious that the addition of pesticides must be made after ammoniation.

This, in turn, adds to the pro-

duction cost since an additional blending operation is involved; and more than that, the blending of just a few pounds of insecticidal material with large masses of fertilizer requires much greater time and care as any fertilizer mixer will recognize immediately. Intimate blending is required to prevent the small portion of insecticide from lodging in one part of the batch and leaving the remainder devoid of any at all. It has been suggested* that preblending the pesticide with a small portion of the batch and then adding this partly-diluted mix to the rest of the batch, will help to solve the problem.

Pesticides vary in their toxicity to man, ranging from practically nil to those with extreme acute toxicity. The fertilizer mixer undertaking to add insecticides to fertilizer products must be fully acquainted with the type of material he is using. (Toxicity data is available from the manufacturers of pesticides) Toxic dusts can be hazardous to workers in some instances, and in such cases, mixing plants must install forced ventilation or other means of exhausting such dusts or mists from the working area. It will also be necessary to clean thoroughly the mixing unit after adding some pesticides, particularly if herbicides, such as 2,4-D, are used.

Other added costs will be realized in the instruction of employees in safe handling of these materials, as well as provision and care of special clothing and protective devices and extra labelling of the finished product, as discussed later. The fertilizer mixer must also consider critically the economics involved in producing two different fertilizers of the same grade—one with a pesticide added and the other without. Such a process would of course add to the cost of production.

Another important consideration is that of wage rates and the attitude of workers and/or labor unions toward working with materials known to be hazardous. Compensation insurance rates are almost bound to rise under such a situation, and some mixers report that insurance com-

panies are reluctant to cover unskilled laborers for work with pesticides. A workman who "gets by" in a fertilizer mixing plant may be incapable of handling hazardous materials with the necessary precautions.

This problem of handling and mixing pesticides and fertilizers goes all through the normal plant operations . . . and beyond. Farmers accustomed to handling bags of fertilizer will also stand the possibility of harm unless they are warned properly and instructed exactly how the mixed products must be handled and used. They must be told how not to use the material . . . on what crops it may be applied satisfactorily and on what ones it could be harmful.

Registration Involved

THIS brings up the most important consideration of all . . . that involving registration, labeling, responsibility for safe use . . . interstate sales.

Fertilizer manufacturers, in many instances, are not too well acquainted with the formidable array of regulations which govern the manufacture, labeling, shipping and sale of pesticidal materials. When such materials are included in a fertilizer mixture, then the laws apply and the mixer, hitherto unaffected by such rules is involved.

The Federal Insecticide, Fungicide and Rodenticide Act of 1947 regulates the marketing of all insecticides in interstate commerce. Under this law, the user of pesticides must be furnished with specific information on how the product should be used to be effective and at the same time cause no damage to the user, his crops, or his animals.

Packages containing pesticides (this would be the fertilizer bag in the case of mixtures) must bear labels showing in addition to the name or brand of the material, net contents, name and address of the manufacturer or distributor, an ingredient statement, a warning or caution statement, and if the product is highly toxic, the word "poison" in red, the skull and cross bones and an antidote statement.

Before any insecticide may be

marketed legally in interstate commerce, it must be registered with the U. S. Department of Agriculture. To obtain registration, an application together with the formula and proposed labeling must be submitted to the Department.**

Should the fertilizer-pesticide mixer say to himself, "Well, these Federal regulations apply only to interstate trade. My business is entirely within my own state", he must be reminded that in addition to the Federal Law, most states also have laws covering the distribution and sale of economic poisons shipped solely within the state.

In states where the sale of fertilizer-pesticide mixtures has been approved, these mixtures must be registered to comply with both the fertilizer and pesticide laws. Fertilizer mixers desiring to market pesticide mixtures must get acquainted with regulations covering this phase of the business.

Discussions with representatives of both the fertilizer and insecticide trades have brought out further questions concerning the sale of pesticide-plant food combinations. In order to print all the information on a bag, would it be possible for a firm to utilize the thousands of bags it may have in stock at the present time? Some have suggested that an additional tag should be affixed, giving all the information about the economic poison contained. "But what happens if the tag is accidentally or otherwise torn off?" one manufacturer inquired.

In view of the fact that liability can go back to the mixer in the event of damages to crop or to user, this poses a serious hazard. "Suppose a farmer in my trade area buys fertilizer containing BHC for use on cotton", one southern mixer asks, "And he uses part of it on his peanut crop. This could very easily make his peanuts unmarketable, and who would be responsible?"

Another point, brought out by an entomologist, is that of correct

(Turn to Page 131)

*Bentz, F. L., Jr., "Should Pesticides be Mixed with Fertilizers", *Agricultural Chemicals*, Vol. 7, No. 5, May, 1952.

**Specific information concerning registration of these materials is available from the U. S. Department of Agriculture, Insecticide Branch, Production and Marketing Administration, Washington 25, D. C.

What's Ahead for the

Fertilizer Industry?

by
Louis Ware*

THE fertilizer industry faces a number of changes and uncertainties in the near future. For nearly two decades there has been a period of rising economy, with increasing national income and continued farm prosperity. The sales and consumption of agricultural chemicals and mixed plant food has reached an all-time high. Growers have enjoyed increasing prosperity, have paid off debts, added much new mechanical equipment to their farm plants, and with larger use of fertilizer have attained the greatest productivity in history. Aided by high demand during two war periods and by price supports and other government help to some extent, they have gained a larger share of the national income than ever before. The fertilizer industry has, with enlarged productive capacity, kept pace with this growth and has likewise enjoyed prosperous times.

But the fertilizer industry is not alone in this expansion and progress during this period. All industry has been expanded and has prospered.

The total national income for 1953 will be approximately \$306 billion, four times that of 1940. Also we are not alone in facing the uncertainties of the future, in fact the plant food industry is in stronger condition and has a much better long term outlook than many other businesses. The farmer has gained better recognition and today it is well understood that the buying power of the agricultural community must be maintained if there are to be prosperous conditions in our whole economy.

Estimates indicate that in this fertilizer year just coming to a close, farmers will have used for the 15th consecutive year, an increased quantity of plant nutrients. They will have used 432 percent as much nitrogen, 324 percent as much P_2O_5 , and 444 percent as much K_2O as they did in 1938, 16 years ago. This year, even with farmers somewhat less prosperous, and faced with a cost-price squeeze, they chose to buy more fertilizer than ever before.

Probably of most importance just now is to estimate the outlook

for the next year's business and judge the trend as far ahead as we can. In that respect, the present is a period of more concern than during any recent years.

There are three main conditions that cause this situation:

- (1) War uncertainty—whether there will be continued small war, big war, just cold war, or the hoped-for peace.

About the Author

*Mr. Ware is chairman of the board of directors, the National Fertilizer Association, and president of International Minerals & Chemical Corporation, Chicago. He is a world traveler and keeps in close touch with business developments, particularly those affecting the fertilizer industry. This paper was presented at the NFA convention, Greenbrier Hotel, White Sulphur Springs, W. Va., June 14-17.

AGRICULTURAL CHEMICALS

- (2) The changed government in Washington having a more realistic approach to farm subsidies, surpluses and such problems.
- (3) The continued expansion and changes in the plant food industry.

Regarding the first and most important, the possibility of war or peace over-shadows all other considerations when trying to forecast our markets ahead. That, of course, is true of our whole economy and it is an uncertainty that will most likely be with us for a long period. It seems certain we are faced with large military expenditures for many years and with that a high rate of industrial activity and employment. The president of a large airplane manufacturing company told me something last week of the new developments in guided missiles, the new steering devices used on these piloted airplanes and the tremendous power plants afforded by the jet engines on military aircraft. We cannot afford to stop work on the development of these devices; we must keep ahead of other nations and it is very, very expensive to do so. That, and the need for continued intensive atomic development alone will assure a lively economy for years ahead. With all the world's ills so prodigious, peace is not likely to come abruptly.

The change in Washington is, in my opinion, to the liking of most business men. The fertilizer industry welcomes and supports correction of the many unsound government agri-

cultural operations. Sufficient time must be allowed, however, and corrective measures should not be made so fast that the agricultural industry will be made to suffer a private depression. It is encouraging to note the concern of the President and others in government in that respect. In fact, there never was a time when an understanding of the need for preserving a degree of prosperity on the farms was more prevalent in our government and when the farmer had a stronger voice in matters affecting new legislation or changes in governmental operations.

Industry Keeps Growing

CONCERNING the great changes in the plant food industry, the expansion during recent years and the present projected growth is familiar to all. Many large nitrogen plants have been built, there are two new potash mines with other expansion in the potash field being planned, the phosphate mining plants have been enlarged and there is greatly increased production capacity of multiple superphosphate, either already completed or being planned. Also large plants are being built to produce high analysis fertilizers. Our industry is over 100 years old in this country, but never before was there anything like these changes and growth.

Much of this expansion was planned in 1951 and urged by the United States Government. At that time the Department of Agriculture, basing their figures on a nation-wide survey and allowing for the increased population and continued advances of technological usage on the farm, predicted there would be required by 1955, 76 percent more nitrogen, 65 percent more P_2O_5 , and 58 percent more K_2O . Encouragement in the form of tax concessions was granted to induce this expansion.

In the fertilizer expansion now in progress and projected between the years 1951 and 1955, private industry is investing some \$600 million of its own capital. These new facilities will be capable of producing \$700 million worth of additional fertilizers. In other words, in order to provide a farmer with \$100 worth of additional

fertilizer someone has to invest \$86 in new plant and equipment.

It is a well remembered fact that the fertilizer industry as a whole earned little or no profit in years 1930 to 1940. The farms of the country were impoverished, collections in the plant food business were poor, and many bad business practices caused the industry to suffer. Now, after a relatively short period of good business and prosperous conditions, the industry has been persuaded to carry out this spectacular growth program. The older companies have built new plants, there are new producers in the field and several of the large chemical companies and others plan to go into the fertilizer business or have already done so.

Farm Income Dwindles

THE current farm situation is not as good as during recent years. Farm exports are down 30 percent and the average prices received by the farmer for his produce are down 17 percent from that of 1951. During this year quantities of foreign nitrogen have been offered, potash from abroad in larger quantities has been imported and it is likely that fertilizer materials from foreign sources will continue to increase.

While a sudden change in the war situation or other unexpected incidents may reverse the condition, it is a fact that there is now a leveling off or down-turn in farm income. Normally it would be expected that fertilizer sales would follow the same trend. However, there have been changes in recent years and there is something we can do about it.

This is a challenge to our industry which can be answered only in one way; that is, by greater sales effort and by adhering to good business practice. If we lessen our efforts to promote greater uses of fertilizer or if we drift into bad business practices, the industry's present well-being could soon be wasted and our outlook turned downward. We have had a relatively long period of easy selling but the time is here for us to promote and sell more aggressively.

(Turn to Page 121)

LOUIS WARE



Record attendance, a panel discussion on use of plant food across the nation and talks by outstanding governmental officials at Homestead hotel, mark the 8th annual meeting of

American Plant Food Council

WITH high-ranking officials of the U. S. Department of Agriculture, the chairman of the House Committee on Agriculture and representatives of colleges, state agencies and the industry on the program, the American Plant Food Council held its eighth annual convention at the Homestead Hotel, Hot Springs, Va., June 11-14. Registration totaled nearly 550, according to Paul A. Truitt, A.P.F.C. president.

An agricultural forum, discussing "Fertilizers Blaze New Trails Across the Nation" featured one program; awards were presented to two farm magazines for their activities in fostering soil-building; and the annual A.P.F.C. banquet featured an address by a prominent U. S. Congressman.

In his annual address, president Truitt told the group that "producing the kinds and quantities of fertilizers necessary to meet the demands of American farmers is a contribution to the national welfare" and reported that plant food production records have been set by the industry for the past 15 consecutive years.

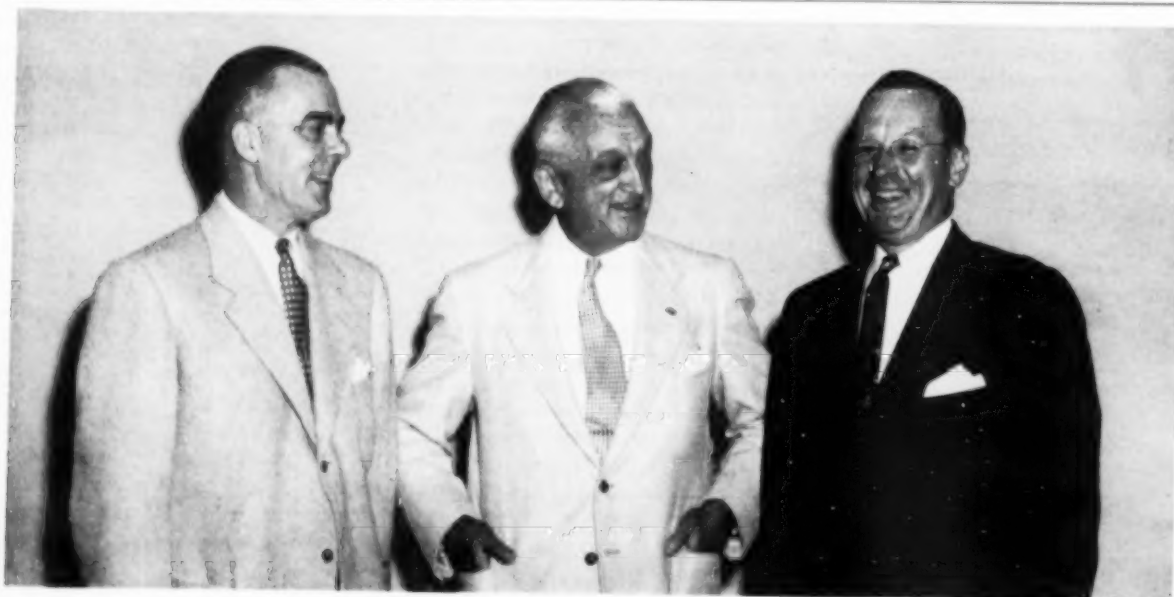
He reviewed the fertilizer industry expansion program calling for 70 percent more nitrogen, 55 percent more phosphate, and 51 percent more potash by 1955, compared with 1951, and said "steady progress is being

made in meeting these tremendously accelerated production goals." He added that new facilities are being built and older operations enlarged as rapidly as possible consistent with the availability of essential materials.

He also reviewed the Land-Grant College and U. S. Department of Agriculture program calling for more efficient use of fertilizer and reported that "some action ranging from an expressed interest to comprehensive programs have been reported in 35 states since September of 1952."

Terming the efficient use of fertilizer "a key to efficiency," Mr. Truitt said that "fertilizer manufacturers have in the past, and will continue to go efficiently about their

Below: Retiring chairman of APFC Executive Committee, James F. Doetsch, Chilean Nitrate Sales Corporation, New York, talks with newly-elected chairman, W.T. Wright, vice-president, F.S. Royster Guano Co., Norfolk, Va. (center) and Paul T. Truitt, APFC president.



work of producing every year new record tonnages of plant foods. Viewing the past 15 years of new records in plant food production which he described as "no small accomplishment," he added that "few industries serving agriculture have done a better job—or have done their various jobs so well—as fertilizer manufacturers."

"Getting farmers to use fertilizer more efficiently is a never-ending job," he said. "There is a job and a responsibility that industry, Government and the Colleges share, and share equally. The farmer must use all the tools of agricultural production wisely and efficiently if he is to stay in the business of farming and if he is to build good consumer relationships."

USDA Policies Changing

THAT the U. S. Department of Agriculture wishes to serve, not dictate to the American people, was emphasized in a talk by Assistant Secretary of Agriculture J. Earle Coke. "Our sole desire is to be of

In the Photos:

(Top row): Albert B. Baker, Jr., Bradley & Baker, New York; C. J. Ball, Phillips Chemical Co., Norfolk, Va.; Albert Woods, George Wash. Phillips Chemical Co., Bartlesville, Okla.; and S. Y. Priddy, Chas. W. Priddy & Co., Norfolk, Va. Mrs. H. B. Mann; Joseph A. Howell, president, Virginia-Carolina Chemical Corp., Richmond, Va. and Mrs. Howell; Dr. H. B. Mann, president, American Potash Institute, Washington, D. C.

Second row: Bill Merritt, H. J. Baker & Bro., New York; Fred Coffee, Wilson & Toomer Fertilizer Co., Jacksonville, Fla.; Glenn Lucas, Peninsula Fertilizer Works, Tampa, Fla.; James Roseman, Woodruff Fertilizer Works, Inc., North Haven, Conn.; and Bill Reinack, H. J. Baker & Bro., New York. Byron E. Stewart and Mrs. Stewart, Jones & Laughlin Steel Corp., Pittsburgh, Pa.

Third row: Dr. Paul D. Sanders, editor, *The Southern Planter* (L) presents to Louis H. Wilson, information chief and secretary, A.P.F.C., a plaque indicating life membership in Agricultural Editors' Association. Dr. & Mrs. A. H. Roseman, chief, Bureau of Plant Industry, Soils and Agricultural Engineering, U.S.D.A., Beltsville, Md.; Mrs. Robert Salter and Dr. Salter, head of the U. S. Soil Conservation Commission, Washington, D. C.

Fourth row: (seated) A. M. Eno, G.I.F., Ithaca, N. Y.; Dr. L. B. Nelson, U.S.D.A., Beltsville, Md.; and Ed. Phillips, G.I.F., New York. (Standing): C. J. Crissy, G.I.F., Ithaca; Bill Stark, Atlantic Fertilizer Co., Riverhead, N. Y.; and George Servino, G.I.F., Ithaca, N. Y. Joe Whittington, Mathieson Chemical Co., Baltimore, Md.; Bill Webster, Quaker Oats Co., Chicago; Rose Worthington, International Paper Co., New York; and John A. Nicholson, Agricultural Chemicals, New York.

Fifth row: W. H. Appleton, Potash Company of America, Atlanta, Ga.; Fred Techter, Nitrogen Division, Allied Chemical & Dye Corp., New York; and E. W. Harvey, Nitrogen Division, Group at one of the receptions at the Homestead during the convention.

Bottom row: Bill Chadwick, International Minerals & Chemical Corp., New York; Bob Lenhart, G.I.F., New York; Milton Malone and Bob Borg, both of International Minerals & Chemical Corp.; K. D. Jacob, U.S.D.A., Beltsville, Md.; James Gorman, American Cyanamid Co., New York; J. M. Porter, American Cyanamid Co.; J. R. Sheffield, Coronet Phosphate; and H. G. Cunningham, Tennessee Corp., Atlanta, Ga.





service . . . we want to help, not take over. We want to give leadership where leadership is our proper function", he declared.

The Assistant Secretary outlined a six-point picture of the Department's future policies as follows:

"First of all, we are committed to greater emphasis on research and education.

"Second, we believe there should be greater integration in research by private and public agencies and we need to tie together these efforts.

"Third, it is a policy in this administration to decentralize government functions. The Land-Grant Colleges with their vast resources in each state and their reputation for objectivity can certainly assume a much greater role in the development of farm programs.

"Fourth, our agricultural policy will emphasize greater development of both.

"Fifth, we are for more conservation, not less. In that connection, we recognize that complete conservation planning requires more than structures to prevent erosion. Those practices which help hold the soil in place are an essential part of the plan. This includes applying mineral elements to make possible the establishment and adequate growth of soil-conserving crops.

"Sixth, there must be maximum freedom for individual farmer action."

The USDA seeks a minimum of restrictions on farm production and marketing to permit the maximum of dependence on the free

market, he said. "This freedom, of course, involves responsibility on the part of farmers. But experience has shown that it is possible through individual and group action to solve many problems with a minimum of Federal assistance and control."

Mr. Coke said that "... some people still haven't brought their thinking about farming up to date," adding that "today's farmer would be bankrupt in five years if his production per man, per man-hour, or per acre was no larger than in the days of our great grandfathers."

He said that "farmers have the desire and the means to produce abundantly" and predicted that "... total production over a period of years will continue to rise."

"If the nutritional level of the American people could be raised just a little, there would be no surpluses of food," he said. "If the reasonable wants of our present population were adequately supplied, this, together with industrial and export outlets, would provide markets for more farm and forest products than we now are turning out."

Stressing the importance of gearing policies and programs "to fit the present situation," Mr. Coke said that "policies and programs of the past have been constructed largely to meet emergency situations" such as "drouth . . . or war, or depression."

Forum Appears

FOLLOWING introduction by Dr. John R. Taylor, Jr., A.P.F.C. agronomist, an agricultural forum was presented to the group to cover "Fertilizers Blaze New Trails Across the

Photos, this page:

Upper picture: (L to R): Bruce D. Channing, Clemson College, Clemson, S. C.; Mrs. J. R. Taylor, Jr.; Hon. J. Earl Coke, Assistant Secretary of Agriculture, Washington, D. C.; Beattie Jackson, Anderson Fertilizer Co., Anderson, S.C.; Dr. Taylor, A.P.F.C. agronomist; Mrs. Channing; and Parks Yeats, Oklahoma City, Okla.

Second row: Group of fair ladies pictured at one of numerous private parties under way at the Homestead during convention.

Third row: Bob Walton, U. S. Potash Co., Atlanta, Ga.; Mrs. Horace M. Albright; Mrs. W. B. Porterfield; Mr. Albright, president, U. S. Potash Co., New York; Mrs. Sam E. Hardwick; Bill Porterfield, U. S. Potash Co., New York; and Mr. Hardwick, also of U. S. Potash Co., Richmond, Va.

Fourth row: Robert Reed, editor, *Country Gentleman*; James Naftel, Pacific Coast Borax Co., Auburn, Ala.; Fred Corkill, Pacific Coast Borax, New York; Frank Lavery, Fertilizer Industries, Inc., New York; Mr. Albright; Jackson Sitten, Carlsbad, N. M.; and Dr. Bill Martin, University of California.

Fifth row: Brief scene at reception. At left, Hugo Riemer, president, Nitrogen Division, Allied Chemical & Dye Corp., New York; and at right end, W. T. Wright, vice-president, F. S. Royster Guano Co., Norfolk, Va.

Fifth row: Leroy Donald, Lion Oil Co., El Dorado, Ark.; H. H. Tucker, Coke Oven Ammonia Research Bureau, Columbus, Ohio; Dr. A. W. Klemme, Univ. of Missouri, Columbia; and Malcolm Hunter, Nitrogen Division.

Bottom row: T. K. Cowden, Michigan State College; Hon. J. Earl Coke; and APFC president Paul T. Truitt.

Nation". Moderator was Dr. Paul D. Sanders, editor, *The Southern Planter*, Richmond, Va. and the members represented different portions of the United States. From the far west, Dr. W. E. Martin, extension soils specialist, University of California, appeared; representing the middle west, Dr. Arnold W. Klemme, extension specialist in soils, University of Missouri, Columbia; from the southeast, H. A. Woodle, leader in Agronomy Extension Work at Clemson Agricultural College, Clemson, S. C.; and as an ambassador from the northeastern states, Lester H. Smith, extension agronomist, University of Vermont, completed the roster.

In his talk preceeding the appearance of panel members, Dr. Sanders described fertilizers as "one of the most effective tools farmers have for lowering the per unit cost of farm products." He pointed out, however, that there are "all too many farmers who are not using plant foods effectively."

"With our farming acres limited, with our farm population decreasing, with farm labor costs as high as they are today, the efficient farmer — in order to stay in business — must use plant foods efficiently," he emphasized.

Pointing to the fertilizer industry's "accelerated program for increasing the production of plant foods," Dr. Sanders said that manufacturers "give ample testimony of their faith in the future of farming" and "have established an enviable reputation by setting new, all-time records year after year."

"A tremendous challenge in

the field of accelerated agricultural education and research programs faces all of us in terms of increasing farming efficiency, of using the know-how that we have, and the equipment and materials that will shorten the gap between the price-cost squeeze," he said.

The first forum member to appear was Dr. Martin, who told the group that "probably the greatest possibility of increased fertilization in California's cultivated crops, is in the barley, wheat, and oats acreages." He said further that some 3½ million acres of these crops are grown in California, and that only 18 percent receives any nitrogen and eight percent any phosphorus. Application rates are low and a four-year study shows 60% of the state's grainland is deficient in nitrogen; 42% deficient in phosphorus and 25% deficient in both.

Declaring that "grain fertilization does pay farmers," the California agronomist cited examples to show "real possibilities for the increased use of fertilizers on grain, if the right materials are used and they are used in proper amounts to give the maximum return to the farmer."

Dr. Martin discussed the improvement of "old worn-out grain land" that a farmer was using as dry-land pasture near Lincoln. He said a thousand acres were seeded to mixtures of three annual clovers — rose, crimson, and subterranean and fertilized with 200 pounds of superphosphate per acre, adding that "... the results are most dramatic."

He explained that "the farmer's range capacity has been at least trebled and enough feed has been left

so that a mixed clover seed crop has been taken in many fields."

"We believe that the use of new species of clover ... together with proper applications of phosphorus, hold the key to improvement of much of our range-land," Dr. Martin emphasized.

(Turn to Page 112)



Photos this page:

Top: Earl J. Coke, Assistant Secretary of Agriculture and T. K. Cowden, Michigan State College economist, address APFC group.

Second row: H. H. McIver, Atlanta, Ga.; C. T. Harding, Virginia-Carolina Chemical Corp., Richmond, Va.; A. M. McIver, Atlanta; and E. G. Crockett, Charles Page & Co., New York.

Third row: Winners of "Soil Builders' Award" are congratulated by Louis H. Wilson, APFC secretary and information chief. (L to R): Representative of Suc-

cessful Farming magazine, representative of Pennsylvania Farmer, contest winners, and Mr. Wilson. Hon. Clifford R. Hope, Kansas, addressing the group.

Fourth row: At Saturday night reception: Ralph Douglass, Smith-Douglass Co., Inc., Norfolk, Va.; Pat Wescott; Douglass Kellam; and Fred Woods, Jr.

Bottom picture (L to R around table): Donald E. Lee; Mrs. F. B. Porter, Mr. Porter, Leon S. Kaneicki; Mrs. Gordon Cunningham and Mr. Cunningham, all of Tennessee Corp., Atlanta, Ga.

**The Chairman of House Committee
on Agriculture Presents his views on**

Congress and Agricultural Policy

THE fertilizer industry is a great and growing one and is naturally closely allied with agriculture. The industry's prosperity depends upon that of the farmer, and he, in turn, is becoming more and more dependent upon the fertilizer industry. Under such circumstances, members of the industry are of necessity intensely interested in agricultural policy, particularly since Government policy has become such an important factor in agriculture and will become constantly more important as time goes on. A discussion of the question of agricultural policy would be of little value unless the writer expresses himself frankly, and that is the premise upon which this paper is presented.

Policy Important Now

AGRICULTURAL policy has been an important subject of economic and political discussion in this country for the last 30 years. It will continue to be. There are at least four reasons why this is the case.

1. Agriculture is so tied in with our total economy that we do not dare to allow it to get too far out of line with other phases of the economy.

2. We must have a vigorous, prosperous and expanding agriculture if we are going to produce the quantity of agricultural products required to meet the needs of a growing nation and to carry out some of the obligations which have been thrust upon us in the field of foreign affairs.

3. There are certain basic social

values inherent in rural life which we cannot lose without grave danger to the future of our nation. These values are imperiled by economic instability in agriculture.

4. The 16 percent of our people who live on farms and the 40 percent additional whose interests are closely related to agriculture constitute an element in the political picture which cannot be denied or overlooked in a nation where the people rule and where economic questions play an important part in determining elections.

With these thoughts in mind, I should like to review certain facts and situations and indicate their relationship to agricultural policy.

First, let me mention the changing nature of agriculture. One hundred and fifty years ago 85 percent of our people lived on farms and it took all of them to produce enough food, fibre and shelter for themselves and the rest of us. One hundred years ago 68 percent of our people lived on farms. Even as late as 1910 a third of our people were engaged in agriculture.

Now, 16 percent of our people live on farms and produce enough food, fibre and shelter for themselves and the rest of us. In the case of a few commodities this production must be supplemented by imports but that is offset by substantial exports of other agricultural products.

This great increase in agricultural efficiency can be ascribed to several things — one is our heritage of rich soil; another is mechanization; still another is our system of agricul-

tural research and education. The combination of these and other factors has made our agriculture the best in the world.

But I still haven't touched upon the most important difference between farming one hundred or even twenty-five years ago and today. Until comparatively recently farming was practically a self-contained industry. The farm itself produced most of the family food; woodlots and forests most of the fuel. Horses or oxen produced on the farm furnished the power. They were fueled by hay and grain grown on the farm. The farm produced its own fertilizer. It produced much of the clothing worn by the family. There was little expense for hired labor because families were large and work was interchanged with neighbors. Taxes were negligible. Capital investment was low. Interest charges were unimportant. In other words, until comparatively recent times, the farmer had little need for cash income.

Heavy Capital Investment

CONTRAST that with the situation of the farmer today. Not only the big farmer or the medium-sized farmer but the little farmer as well requires a heavy cash outlay. He must purchase his power in the form of tractors and other farm equipment. He must buy gasoline or distillate as fuel. He must buy fertilizer. Hired labor is costly if he can get it. Often he cannot get satisfactory labor which in most cases must be skilled labor

*From paper presented at 8th annual meeting of American Plant Food Council, Hot Springs, Va., June 13, 1953.

by

Hon. Clifford R. Hope

Congressional Representative from Kansas
Chairman, House Committee on Agriculture
Washington, D. C.



familiar with intricate modern machinery. He has a large investment in plant and equipment and requires much working capital upon which interest must be paid. He has large sums tied up in transportation equipment. He has a heavy outlay for insurance and for taxes. The annual depreciation on his machinery and equipment often amounts to more than his entire cash outlay a few years ago.

For these reasons it can be seen that while the market price of farm products might have been an unimportant factor in the past, today it is everything. Any farmer must have substantial cash receipts in order to meet his current operating expenses and his prices must be high enough to pay these charges and lay aside a reserve for depreciation to say nothing of the reasonable profit to which he should be entitled as legitimately as any other business man.

Can't Control Costs, Prices

WITH few exceptions, the farmer's costs are determined by someone else. He has no bargaining power to enable him to reduce them. If he consumes electric power the price of that is fixed by a public commission. The wages of his hired labor are fixed by competition with industrial enterprises where wages, hours and working conditions are determined by collective bargaining between well entrenched labor unions and industries which can pass high labor costs on to consumers.

His taxes, his transportation

rates in getting his products to market centers, his insurance rates — all are fixed by law or by the action of state or Federal agencies. The price of his fuel and his fertilizer and his farm machinery and equipment is not the subject of bargaining as far as he is concerned. He pays what the seller demands.

On the other hand, with certain unimportant exceptions the farmer has nothing to say about the price of his products. If he ships his cattle and hogs to Omaha or Chicago he takes what the buyers offer him and they all offer him substantially the same. His alternative is to ship his livestock back home again.

When he takes his grain to market he does not say how much he will take for it. He says "How much will you give me?"

Thus, with a few inconsequential exceptions, the farmer has nothing to say about the price of the things he buys or the price of the things he sells. Somebody else determines both figures. Furthermore, his unit cost of production especially in the case of crops depends very largely on the yield. The weather, insect pests and plant diseases have much to do with this, no matter how good a job of farming a man does. His corn may make 75 bushels an acre one year and 25 bushels the next. In the latter case, assuming that his expenses are exactly the same, the cost per bushel is three times as much as it was in the previous year.

This is not to say that good farming doesn't pay or that efficiency

doesn't reduce costs. The point is that no farmer can tell in advance what his costs are going to be. How long could you stay in the fertilizer business if your costs and selling price were fixed by someone else and the quantity and quality of your production was determined in most cases by weather and other factors beyond your control?

Farm Income Below Others

IT might be well at this point to say something about farmers' income as compared with those engaged in other occupations. Compared with the previous decade, the war years and the years since the war have been good years for farmers. Net farm income increased from \$4.5 billion in 1940 to \$16.7 billion in 1948. Since then it has dropped, being \$14.7 billion in 1952.

Part of the increase is due to expanded production. For the last six years agricultural production has averaged 38 percent above pre-war. The greatest year of all was 1952, with production up 45 percent from the 1935-39 period. Of course, a large part of the dollars and cents increase is simply inflation.

This increase in agricultural production and income has enabled farmers to participate to some extent in the improved standard of living in this country. But agriculture generally has lagged behind other industries and those engaged in it still constitute an income group that is far below the average for the country as a whole.

(Turn to Page 102D)



**A Magnesium
Chlorate Product**
as a new

Cotton

A VERITABLE revolution in the harvesting of cotton has been under way for some years. The means of reducing much of the labor formerly used in plucking bolls of cotton have been both mechanical and chemical . . . one of the most outstanding of the former being the mechanical cotton picker. But it in turn must rely to a considerable extent upon chemical defoliants in order to do its most efficient work.

Leaves allowed to remain on cotton plants at harvest time can be troublesome, particularly if green, because the machinery crushes the leaves and lint together, leaving objectionable stains. Dried leaves are also a problem because trash cannot always be cleaned away from the cotton at the gin without extra expense.

But the mechanical pickers are here to stay. They are speedy and can keep ahead of fall rains and frost. Labor problems thus are greatly simplified. The main advantage, how-

In the Photos:

Top picture, this page: Field of rank down cotton before defoliation.

Second photo: Airplane application of "De-fol-ate" at the rate of 10 pounds per acre in a California cotton field, 1952.

Lower photo: Field in Arizona defoliated with the material at 10 lbs. per acre.

Opposite page: Two-row cotton picker in Arizona field which has been defoliated with same product at rate of 10 lbs. per acre.

Defoliant

by
A. G. Ash
and
E. H. Karr*

ever, is the substantial reduction in the cost of picking cotton. In order to stay in business, a cotton grower must produce his crop both efficiently and economically. A mechanical cotton picker is not cheap, but if such an investment means decreased production costs, it can represent the difference between profit and loss.

To get the best possible benefit from mechanical picking, however, cotton plant leaves had to be controlled. To attain this ideal, various chemicals have been applied to the cotton fields in an effort to cause the leaves to fall off prior to harvesting. Various chlorate compounds and

formulations, cyanamides, chloroacetates, xanthates, endoxophthalates ("Endothal"), and chromates are but a few. All of the above materials and many more have shown promising results at one time or another or in certain areas and under certain climatic conditions.

There are many chemicals that can be used to cause cotton defoliation under closely controlled greenhouse conditions and also when the same set of conditions is met in the field. But what is needed for a commercial defoliant, above all else, is dependability. The growing conditions for cotton vary widely and con-

sequently a good defoliant must be a versatile chemical.

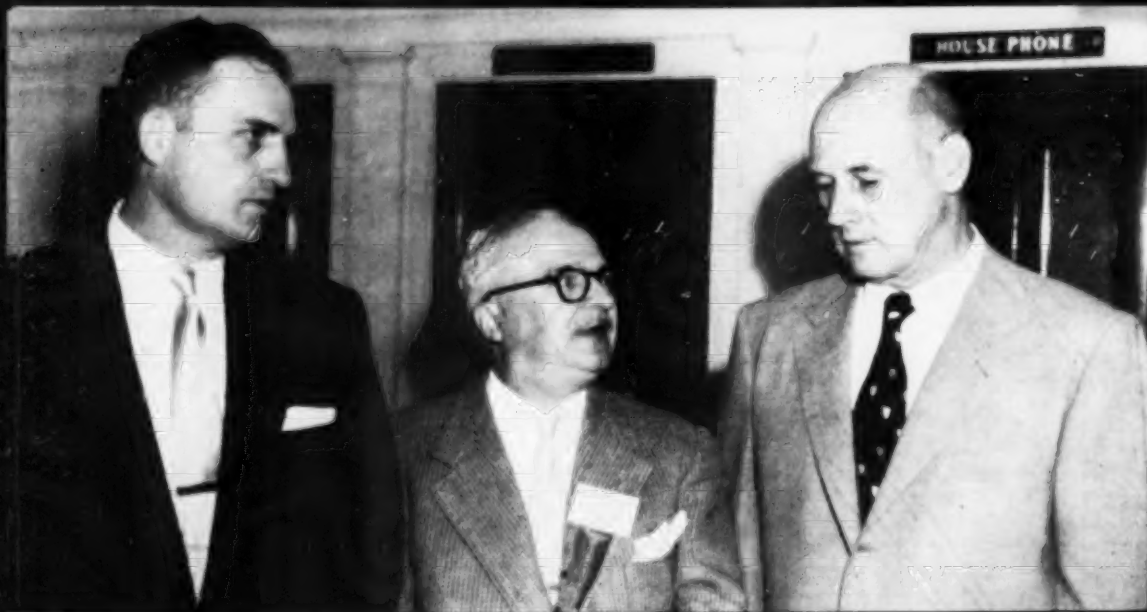
Only a few workable defoliants have emerged. The principal ones are sodium and calcium cyanamides, "Endothal," and the chlorates. The chlorates and sodium cyanamide have the advantage of not requiring dew.

Sodium chlorate, in combination with a fire suppressant, such as certain borate compounds, has been used fairly extensively by the cotton industry for five years or more.

The active ingredient in chlor-
(Turn to Page 107)

* Mr. Ash is Technical Sales Service Representative and Mr. Karr Technical Director of the Pennsylvania Salt Manufacturing Company of Washington.





Left: Dr. Russell Coleman, NFA president, listens in as J. E. Totman (center), Summers Fertilizer Co., Baltimore, Md., and ex-chairman of NFA board discusses the convention with Louis Ware, present board chairman.

Salesmanship Stressed at June Meeting of National Fertilizer Association

DESPITE a strike of hotel employees which disrupted the Greenbrier's usual service but failed to dampen the convention spirits of its guests, the National Fertilizer Association held its 28th annual convention at the Greenbrier, White Sulphur Springs, W. Va. The meeting began June 15 and closed the 17th.

Speakers on the program included high officials of the U. S. Department of Agriculture, members of Congress, growers, the industry and Association officials. Two panels, one discussing "Efficient Water Utilization"; and the other "Proper Use of More Fertilizer" appeared at various times on the NFA program.

Dr. Russell Coleman, NFA president, told the nearly 900 attendants present, that the fertilizer industry holds one of the greatest weapons to correct food problems in the nation, whether the problem is one of shortage or of surplus. Terming the use of fertilizer a "two-edged sword", the NFA head pointed out that one edge has the ability to increase agricultural production, thus giving the nation a strong weapon against starvation. "The other edge of this sword can slash the cost of producing farm commodities, thus en-

abling the American farmer to compete profitably in a declining farm market and to produce lower-cost food for the consumer."

Dr. Coleman asserted that for these reasons, there is a strong place for fertilizers regardless of whether there is a struggle against hunger or

a battle against high food costs. "How well the farmers learn to use this weapon will determine to a considerable extent, the solution of our agricultural problems," he said.

Currently, farm prices are in a downward trend, the president reminded, which gives the grower but

"ROUGHING it at the Greenbrier" is the way some attendants described the situation when a strike was called against the hotel by Local 637 of the International Brotherhood of Electrical Workers right in the middle of the National Fertilizer Association's convention at White Sulphur Springs.

The strike and the subsequent lack of normal hotel service including room service, table service, laundry, etc., introduced an entirely novel spirit of comradeship among the conventioners.

The annual banquet, always a high point on the social calendar of the convention, found the nearly 900 NFA guests standing in long lines waiting to pick up their own plates, cafeteria style. The plates, in turn, were filled at well-stocked tables manned by non-striking hotel personnel including telephone operators, credit department men and women, golf caddies, an archery instructor, swimming instructor and other executives obviously

Strike! Strike!

unaccustomed to dishing out potato salad, sliced turkey, baked potatoes, and vegetables. Yet, there was a minimum of confusion, practically no complaining. An over-all spirit of fun brought about by a common inconvenience, actually provided a better atmosphere for getting acquainted with strangers than could ever have been devised purposely.

Carrying trays of slightly used dishes back to the kitchen and providing guests with coffee or iced tea, were grinning executives whose normal occupations provide them with a relatively secluded life in plush offices where the public seldom treads. Yet, they, like everyone else caught in the unusual circumstances, were taking the whole matter in good spirit.

A spectacle probably never again to be reproduced at the swank Greenbrier, was that of elegant ladies in evening clothes carrying their own

one alternative — that of cutting his production cost. This can be accomplished principally by wise use of fertilizer. On corn, for instance, the present crop could be grown on 20% less acreage if state recommendations for fertilization were followed. "Thus 20% less land in cultivation would require less labor and less investment", Dr. Coleman asserted, and this would amount to some \$500 million each year from the cost of producing America's corn crop. To cut production costs in this manner, some \$181 million worth of fertilizers would be needed on corn. The result would be a savings of a half billion dollars, without adding to our grain supply. The same is essentially true of other crops such as cotton, wheat, and pastures.

"In fact, if fertilizers were properly used on all of America's crops this year, they could cut at least 1 billion dollars off the cost of production by producing our crop needs on fewer acres," he said. "How else can the farmer increase his income so much without adding to the farm surplus problem? What other method would be more practical for minimizing government payments to the farmer than to encourage him to lower

his cost of production through proper fertilizer usage?"

The fertilizer industry has a tremendous potential volume, regardless of the status of farm prices, but a job of education must be accomplished first. Along this line, the NFA head enumerated some of the projects being undertaken by the Association. These include the interpretation of dollar-and-cents returns for fertilizers in various states; presenting this information to bankers; production of film strips aimed specifically at farm youth; continuation of

In the Photos

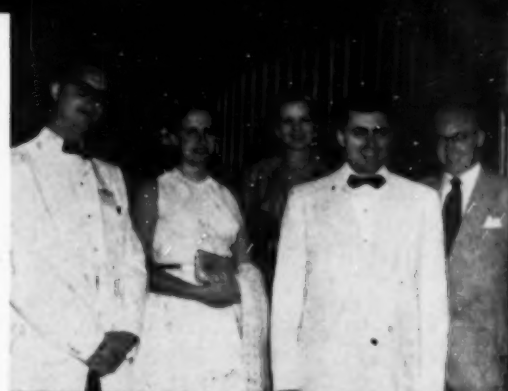
Top row: C. J. Bown, Mrs. Bown, Mrs. R. Q. Parks, Dr. Parks, and E. E. Winne, all of Grace Chemical Co.

Second Photo: Louis Ware, chairman, NFA board of directors and president, International Minerals & Chemical Corp., Chicago; True D. Morse, Under-Secretary of Agriculture, Washington, D. C.; and Russell Coleman, NFA president.

Third photo: Malcolm E. Hunter, Nitrogen Division, Allied Chemical & Dye Corp., Richmond, Va.; Hugo Riemer, president, Nitrogen Division; and O. W. Terhune, Terre Co., Rochelle Park, N. J.

Fourth picture: W. J. Murphy, E. M. Kolb, New York; Peter Colefax and W. J. F. "Buck" Francis, Los Angeles, all of American Potash & Chemical Co. The ladies are Mrs. Kolb and Mrs. Murphy.

Lower picture: R. P. Thomas and A. Norman Into, International Minerals & Chemical Corp., Chicago, Ill.



So What?



Part of the lineup at NFA banquet at Greenbrier's main dining room. Good fun prevailed as each one waited on himself.

trays of food through the crowded dining room. Many were seen gingerly balancing their dishes hoping to prevent baked potatoes or other objects hot or cold from slipping off and down the back of others' gowns.

Obviously, wide, fluffy evening

formals were not designed as attire for waitresses; nor were the wearers cut out for that kind of work. But still, there seemed to be no casualties as dignity took a back seat to necessity.

Expressions of ill-concealed distaste could be detected on the faces of neat, trim, well-dressed office girls as they cleaned up tables. They did a good job although their feelings could be understood easily.

"It's a strange thing", one conventioneer remarked. "When service is normal and good, everyone growls about slow service and inept waiters. Now, here we are carrying our own dishes and standing in line and having a whale of a good time doing it!"

His observation seems to sum up, more or less, the feeling of most of the convention people.

And furthermore the guests made up their own beds, too. But this your reporter couldn't observe; except in his own case in which the bunk looked pretty sad after his straightening out the sheets for the night.

color-sound films telling the economic advantages of fertilizer use; initiation of regular information to radio and the press; and furnishing promotional ideas to the trade.

Panel on Irrigation
A PANEL on "Efficient Water Utilization" brought out the fact that application of fertilizer materials in and through irrigation sys-

tems, is an unmistakable trend not only in the arid regions of the United States, but in the so-called "humid" regions as well.

With H. H. Tucker, Coke Oven Ammonia Research Bureau, Columbus, Ohio as chairman, the other three members of the panel were: W. B. Camp, W. B. Camp & Sons, Inc., Bakersfield, Calif.; R. Q. Parks, manager, agricultural service, Grace Chemical Co., Memphis, Tenn.; and James E. Ferguson, Sprinkler Irrigation Assn., Washington, D. C.

Dr. Parks told the group that droughts are common in all of the humid states, despite an apparent abundance of annual rainfall. He told of numerous experiments where irrigation practices have been used successfully, and emphasized that where crop yields are increased through this means, more and more plant food must be added to the soil to compensate for the large quantities removed by the harvest.

Among these things are water resources which need to be studied thoroughly before irrigation projects are extended further. Questions must

Photos this page

Top row: Joan Buhner; E. J. Buhner, Buhner Fertilizer Co., Louisville, Ky.; Mrs. Buhner and Lyn Buhner, Bill Morris, Chemical Packaging Corp., Atlanta, Ga.; C. L. White, Geigy Co., Inc., Aberdeen, N. C.; Frank W. Thomas, Jr., Mathieson Chemical Corp., Little Rock, Ark.; and Robert Zipse, Geigy Co., Inc., New York.

Second row: Actors in "Mekodrama" written by George V. Taylor, Spencer Chemical Company, Kansas City, Missouri. Actress is Mrs. Harold Dinges, Spencer, signing a rather lengthy contract held by the villain, Rex Morgan, Ark-Mo Plant Food, Walnut Ridge, Ark., as the hero, William E. Chase, NFA staff, Washington, looks on. (PS: the villain was foiled in his attempt to cheat the innocent maiden out of her farm; productivity of land was built up through fertilization and hero & gal lived happily ever after). Second photo: Richard P. Bond, Consolidated Chemical Industries, Inc., New York; Joe Whittington, Mathieson Chemical Corp., Baltimore, Md.; W. B. Howe, French Potash & Import Co., New York; Abe Goldhaar, Universal Detergents, Long Beach, Calif.; Baird Green, Jackson Fertilizer Co., Jackson, Miss.; and W. W. Leble, Mathieson, Baltimore, Md.

Third row: Proctor W. Gull, Spencer Chemical Co., Kansas City, Mo.; Mr. & Mrs. Doug Kelly, Jr., Lion Oil Co., El Dorado, Ark. Second shot: Mr. & Mrs. H. C. Doslinzer, O. M. Scott & Sons Co., Marysville, Ohio.

Fourth row: T. E. Bradley, Potash Co. of America, Peoria, Ill. and John A. Miller, Price Chemical Co., Louisville, Ky. Second photo: Mrs. Robert M. Salter, Dr. Salter, Soil Conservation Commission, Washington, D. C.; Maurice H. Lockwood, vice-president, International Minerals & Chemical Corp., Chicago, Ill.; Dr. Harold E. Myers, Manhattan, Kansas, president, American Society of Agronomy; and Mrs. Myers.

Bottom row: Louis Ware; Weller Noble, Berkeley, California; and Horace M. Albright, president, U. S. Potash Company, New York. Second picture: W. B. Camp, Bakersfield, Calif.; True D. Morse, Under-Secretary of Agriculture, Washington, D. C.; and Dr. Bruce D. Coaninger, Clemson Agricultural College, Clemson, S. C.



be answered such as where underground water sources are located and their capacity. Limited studies have been made to indicate that such supplies are being used to near capacity in a few highly-developed industrial areas, but at the same time, it is also shown that there are many other areas where underground water-bearing strata could be used for large acreages of pump irrigation.

Somewhat the same is true about how much water should be used. Should a sprinkler run for 30 minutes? An hour? Two hours? Or half a day? This leaves a range of from 400% to 500%, which is far too wide for determining the economics of the situation.

How fast will the surface soil take water, is one factor which must be determined, he said. This has to do with the application of fertilizer materials through the irrigation water. He cautioned that although the effi-

ent use of supplemental irrigation will require greatly increased use of fertilizers, still, not necessarily the same plant food materials may be used. "Higher levels of production and

more efficient production will require greater attention to nutrient balance and to nitrogen source," he declared. Because of greater possibility of nitro-
(Turn to Page 116)

Photos this page

Top row: Jack Ryan, Fulton Bag Co., St. Louis, Mo., (L.) receives a "Welcome" pin from S. L. Nevins, Mathieson Chemical Co., Little Rock, Ark. (R), chairman of the NFA Hospitality Committee. In center is Frank Kerr, Fulton Bag, New Orleans. Second photo: Gene L. Bruton, Ferro Corp., Cleveland, Ohio; Mrs. Bruton; Dr. J. W. Turventine, president-elect, American Potash Institute, Washington, D. C.; Mrs. E. I. Walters, and Mr. Walters, Green Thumb Products Co., Ft. Lauderdale, Fla.

Second row: Henning Waltersdorph, Magnolia Fertilizer Co., Seattle, Washington; Arthur Wilkinson, Consolidated Mining, Montreal, Canada; Mrs. Waltersdorph. Lee Waltersdorph; and Ray E. Neidig, Balfour, Guthrie & Co., San Francisco, Calif. Second photo in row: (standing) Charles F. Martin, Miami Fertilizer Co., Dayton, O.; Victor Lillie, Canadian Industries, Montreal, Canada; A. Norman Into, International Minerals & Chemical Corp., Chicago; and Joe F. Stough, International Minerals & Chemical Corp., Chicago. (Seated): Mrs. Stough, Mrs. Martin, and Marilyn Burbank, NFA Staff.

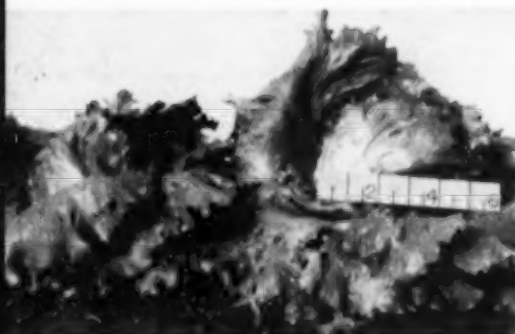
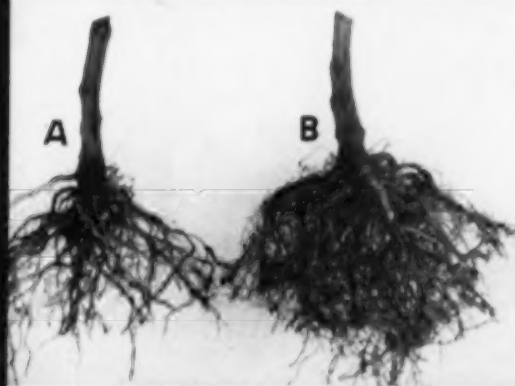
Third row: On behalf of *Agricultural Chemicals* magazine, L. A. Long, editor, receives National Safety Council's Public Interest Award for 1952. Presenting award is John E. Smith, Spencer Chemical Co., Kansas City, general chairman, Fertilizer Section, N.S.C. Second photo: at fertilizer safety committee meeting. (back row, L. to R.): Paul T. Truitt, president, American Plant Food Council, Inc., Washington, D. C.; Thomas J. Clarke, G.I.F., Ithaca, N. Y., safety committee secretary; and Dr. E. C. Kapusta, NFA, Washington. (seated): Vernon S. Gornto, Smith-Douglass Co., Inc., Norfolk, Va., safety vice-chairman; John E. Smith; and Stewart A. Washburn, National Safety Council, Chicago.

Fourth Row: Mrs. A. A. Schultz and Mr. Schultz, Reading Bone Fertilizer Co., Reading, Pa.; Mrs. Tobias Bradley and Mr. Bradley, Potash Co. of America, Peoria, Ill.; Joe E. Culpepper, and George V. Taylor, Spencer Chemical Co., Kansas City, Mo.

Bottom row: Fielding Reed, American Potash Institute, Atlanta, Ga.; and W. L. Nelson, Agricultural Experiment Station, Raleigh, N. C. Members of panel on irrigation development: H. H. Tucker, Coke Oven Ammonia Research Bureau, Columbus, Ohio; W. B. Camp, W. B. Camp & Sons, Bakersfield, Calif.; James E. Ferguson, Sprinkler Irrigation Association, Washington, D. C.; and R. Q. Parks, Grace Chemical Co., Memphis, Tenn.



Response of Vegetable Crops to Soil Conditioners



IT is well known that the structure of a soil can affect the growth and yield of crop plants. Usually, plant response is most unfavorable on heavy clay soils of poor structure, but it is unfavorable also on some other soils having poor physical properties. Heavy rains pack such soils, which form thick crusts as they dry out. Such packing retards water penetration and restricts the root growth of many vegetable plants.

Some of the recently developed synthetic soil conditioners give research workers an important new tool for improving and maintaining the structure of many soils. Although synthetic soil conditioners are now too expensive for extensive field use for vegetable crops, it is worth while to learn their possible effects. The effect of hill placement in small intensive plantings has been studied.

Garden experiments were conducted at Beltsville, Md., in 1952 to determine the effects of three con-

ditioners: a copolymer, the calcium salt of vinyl acetate and maleic acid ("Krilium No. 6"²) and two forms of hydrolyzed polyacrylonitriles ("Krilium No. 9"³ and "Aerotil"⁴) on growth and yield of some vegetables¹.

Materials and Methods

SOIL conditioners were worked into plant hills 2 days before the crops were planted in Sassafras silt loam. "Krilium No. 6" was worked into hills about 9½ inches in diameter and approximately 6 inches deep for the following early crops: Early One broccoli, Pennlake lettuce, Golden Acre cabbage and Eastern States F₁ tomatoes. "Krilium No. 6" and no. 9 and "Aerotil" were worked into 24-inch diameter hills for a late

¹ Furnished by Monsanto Chemical Co.

² Furnished by American Cyanamid Co.

³ The names Krilium No. 6, Krilium No. 9 and Aerotil are supplied here only so that available data can be reported factually. The United States Department of Agriculture does not guarantee or warrant the products. The use of the names by the Department does not imply approval of the products to the exclusion of others which may also be suitable.

Illustrations, this page

Above: Roots of Eastern States F₁ tomato (A) grown in nonconditioned soil; (B) grown in soil treated with "Krilium," 1 part per thousand parts of soil in the plant flat and after transplanting in a 9½-inch treated hill.

Second photo: Four large plants at right grew in flat of Sassafras silt loam soil conditioned with "Krilium No. 6", 1 part per thousand parts of soil. Four smaller plants on left grew in same soil, but not treated. Note porosity of soil and soil aggregates on the right. (Six-inch rule lends perspective).

Third photo: Large Pennlake lettuce plant on right growing in Sassafras silt loam soil conditioned with "Krilium No.

6," rate of 1 part per thousand parts of soil in the seedling flat and within a 9½-inch hill. The other plant is growing in untreated soil.

Fourth photo: Tomato plant on left grown in soil conditioned with "Krilium No. 6" at 1 part per thousand parts of soil, both in the flat before transplanting and in a 9½-inch treated hill in the garden. Plant on the right was grown entirely in nonconditioned soil.

Lower photo: These tomato plants respond favorably to conditioning of soil in flats before transplanting. (A), "Krilium No. 6"; (B), no conditioner; (C), "Aerotil." Conditioners were applied at 1 part per thousand parts of soil in 24-inch diameter hills.

by
R. E. Wester

Associate Horticulturist,
U. S. Department of Agriculture,
Bureau of Plant Industry, Soils and
Agricultural Engineering,
Beltsville, Md.



crop of Marglobe tomatoes.

All transplanted seedlings were grown in wooden flats in fertilized Sassafras silt loam soil untreated with conditioner and treated with the respective synthetic soil conditioners at 1 part per thousand parts of soil. For the early tomatoes, "Krilium No. 6" was used at rates ranging from 1/10 part to 2 parts per thousand parts of soil within the hills only. For broccoli, cabbage, lettuce, and late tomatoes, the respective soil conditioners were used at the rate of 1 part per thousand within the hills.

The soil in the garden was worked into excellent tilth by a rotary incorporating a rye cover crop 8

inches tall and 1,000 pounds per acre of 5-10-5 fertilizer on March 10, 1952. The same amount of dolomitic limestone was raked into the soil surface on March 19.

At the time of transplanting the early crops in the spring, when the soil contained considerable moisture, there was difficulty in getting a good mixture of "Krilium No. 6" with the soil. This was overcome by diluting the "Krilium" for each hill with about 1/4 cup of air-dried soil. Fertilizer was then mixed with the soil "Krilium" mixture. Three shovels of soil from each 9 1/2 inch diameter hill was placed in a wheelbarrow. The "Krilium" and fertilizer were

Placement of soil conditioner in a hill is practical for home gardeners. Here the conditioner is being applied on surface of 24-inch-diameter hill and mixed thoroughly to depth of about 6 inches. Two days later, a Marglobe tomato plant was set out in the hill.

mixed rapidly and thoroughly with the soil and the conditioned soil was returned to the hill. The fertilizer treatment consisted of 1/2 part of steamed bonemeal and 1/4 part of 5-10-5 fertilizer per thousand parts of soil. The control hills were fertilized in the same way as the treated hills.

In mixing the conditioners with the soil for the late planting of tomatoes no difficulty was encountered. The soil, particularly the sur-

TABLE 1

Amounts of active soil conditioner used in each treated hill of each of several vegetables at transplanting and conversion equivalents to rate per acre when applied in each hill and when applied on the whole area.

| Vegetable | Approximate hill diameter | Spacing | | Hills per acre | Amount or rate of conditioner applied | | | |
|--|---------------------------|---------------|--------------|----------------|---------------------------------------|-------------------------|--------------------------------------|--------------------------------------|
| | | Between hills | Between rows | | Actual amount per hill | Per 1,000 parts of soil | Equivalent rate per acre within hill | Amount required for hills in an acre |
| | Inches | Feet | Feet | Number | Grams | Parts | Pounds | Pounds |
| Broccoli and cabbage ¹ | 9.5 | 2 | 2.5 | 8712 | 10.4 | 1.0 | 2,000 | 200 |
| Lettuce ¹ | 9.5 | 1 | 2.5 | 17424 | 10.4 | 1.0 | 2,000 | 400 |
| <i>Tomato</i> | | | | | | | | |
| Eastern States F ₁ ¹ | 9.5 | 2 | 3.5 | 6223 | 1.0 | .1 | 200 | 14 |
| Do | 9.5 | 2 | 3.5 | 6223 | 5.2 | .5 | 1,000 | 71 |
| Do | 9.5 | 2 | 3.5 | 6223 | 10.4 | 1.0 | 2,000 | 143 |
| Do | 9.5 | 2 | 3.5 | 6223 | 20.8 | 2.0 | 4,000 | 285 |
| Marglobe ¹ | 24.0 | 3 | 3.5 | 4149 | 65.3 | 1.0 | 2,000 | 597 |

¹Plants set in treated hills were grown to transplanting size in soil treated with 1 part of Krilium No. 6 per thousand parts of soil. Control plants were grown in soil without conditioner at any stage of growth.

face, had dried sufficiently so that the conditioners (1 part per thousand of soil) could be placed on the surface of the soil and mixed into the hill with a shovel. Mixed fertilizer and bonemeal were used for these hills at the same rates as used for early tomato plants.

Early tomato plants were set 2 feet apart in the row on May 12, 1952, and trained to a fence wire. Within hills, the soil was treated with "Krilium No. 6" at rates of 1/10, 1/5, 1 and 2 parts per thousand parts of soil (table 1). The treatments were randomized in 7 replicates.

Late tomato plants were set 3 feet apart in the row on June 20, 1952, and trained to a fence wire. The 24-inch diameter hills were treated about 6 inches deep with "Krilium No. 6" and No. 9 and "Aerotil" at the rate of 1 part per thousand parts of soil within hills. These treatments were randomized in 11 replicates.

Broccoli, cabbage, and lettuce were transplanted to the garden on March 26, when they were 5 weeks old. Twenty hills of each conditioned with "Krilium No. 6" were paired with 20 control hills. Cabbage and broccoli plants were spaced 2 feet apart in the row and lettuce plants were spaced 1 foot apart.

The actual amounts of soil conditioners used in each hill are given in table 1, with conversion equivalents to rate per acre within the hill and calculated amounts required to treat all the hills in an acre spaced as in this work.

When half grown, cabbage, broccoli, and lettuce were fertilized with ammonium nitrate at the rate of 350 pounds per acre. Yield records were taken from the first 10 pairs of undamaged plants of each crop when one of the paired plants reached prime marketable condition.

The tomato plants were fertilized with a tap water solution of all major and minor nutrient elements in proper amount and proportion. Each plant received one-half gallon of this solution at transplanting and when blooming started. After the first fruit had set, each plant was given 1 gallon at four 15-day intervals.

To insure maximum set of flowers during the cool weather of the early part of June, 30 parts per mil-

lion of para-chlorophenoxy acetic acid was sprayed 5 times on each flower (Turn to Page 125)

TABLE 2

Effects of hill treatment of Sassafras silt loam soil with Krilium No. 6 at 1 part per 1,000 parts of soil on early yield of broccoli, lettuce, and cabbage.¹

| Variety and Crop | Early yield per plant | | L.S.D. | |
|---------------------|-----------------------|----------------------|--------|--------|
| | Treated | Control ² | .05 | .01 |
| | Ounces | Ounces | Ounces | Ounces |
| Early One broccoli | 10.9 | 4.4 | 4.7 | 5.4 |
| Pennlake lettuce | 12.7 | 5.7 | 3.1 | 3.8 |
| | Pounds | Pounds | Pounds | Pounds |
| Golden Acre cabbage | 4.4 | 3.0 | .4 | .5 |

¹Application was to soil within the plant-growing flat and within the hill only. Amount actually used per total area of land was equivalent to 200 pounds per acre for broccoli and cabbage and 400 pounds per acre for lettuce (see table 1).

²The plants in the controls later became as large as those in the treated plots.

TABLE 3

Effects of treatment of Sassafras silt loam soil with Krilium No. 6 on soil reaction, distribution of yields and root growth of early Eastern States F₁ tomatoes.

| Parts of Krilium No. 6 per thousand parts of soil in hills. ¹ | pH of soil at end of season | Average yield of ripe fruit per plant at indicated season | | | | Average fresh weight of roots |
|--|-----------------------------|---|------------------------|-------------------|--------|-------------------------------|
| | | Early ² | Midseason ³ | Late ⁴ | Total | |
| Number | | Pounds | Pounds | Pounds | Pounds | Grams |
| 0 | 5.5 | 1.0 | 6.1 | 7.7 | 14.6 | 65.6 |
| 0.1 | 5.4 | 2.0 | 7.1 | 6.4 | 15.4 | 78.4 |
| 0.5 | 5.2 | 2.2 | 7.8 | 5.8 | 15.8 | 86.0 |
| 1.0 | 5.5 | 2.0 | 7.5 | 5.6 | 15.1 | 85.2 |
| 2.0 | 5.4 | 2.2 | 8.1 | 5.1 | 16.1 | 87.9 |
| L.S.D. at .05 | | .6 | .5 | 1.8 | 2.4 | 8.8 |
| L.S.D. at .01 | | .8 | .7 | 2.5 | 3.2 | 11.9 |

¹Application was to soil within the plant-growing flat and within the hill only. Amounts required to treat all the hills in an acre at the spacings used: 0, 14, 71, 143 and 285 pounds per acre (see table 1).

²Harvested July 9, 16 and 23. Control plants had no ripe fruit July 9.

³Harvested July 30, August 7, and 13.

⁴Harvested August 20, August 27, and September 3.

TABLE 4

Effects of treatment of Sassafras silt loam soil with three soil conditioners at 1 part per 1,000 parts of soil on soil reaction and distribution of yield and root growth of Marglobe tomato.¹

| Soil Conditioner | pH of soil at end of season | Average fruit yield per plant at indicated season | | | | Average fresh weight of roots |
|------------------|-----------------------------|---|------------------------|-------------------|--------|-------------------------------|
| | | Early ² | Midseason ³ | Late ⁴ | Total | |
| | | Pounds | Pounds | Pounds | Pounds | Grams |
| None | 6.3 | 1.9 | 4.8 | 7.0 | 13.7 | 94.1 |
| Aerotil | 6.3 | 3.9 | 5.0 | 10.4 | 19.2 | 101.6 |
| Krilium No. 6 | 6.0 | 3.1 | 6.0 | 11.7 | 20.8 | 101.0 |
| Krilium No. 9 | 6.2 | 3.9 | 6.6 | 11.2 | 21.7 | 112.8 |
| L.S.D. at .05 | | 1.0 | .8 | 1.9 | 3.9 | 9.1 |
| L.S.D. at .01 | | 1.4 | 1.1 | 2.6 | 5.2 | 12.4 |

¹Application was to soil within the plant growing flat and within the hill only. Amount actually used per total area of land was equivalent to 597 pounds per acre (see table 1).

²Harvested on September 3 and 16.

³Harvested September 26 and October 3.

⁴Harvested October 8 and 17.

The Role of Publicity in

Fertilizer Plant Safety*

IN considering the subject of publicity in connection with safety, we find that some of the usual definitions applied to "publicity" fall a little short of covering the scope of what the term means in this field. One public relations expert defines publicity as "A technique of public relations which involves presenting a message to the public through media which are not paid for the purpose." Another definition, a little more apt, terms publicity as "measures for getting public notice; being seen or known to everybody."

Presenting the safety message so that it is seen and known to everybody involves much more than merely getting notices in the press. Actually, it falls into the category of Education. Thus, the objective is to find ways and means to convey the idea of safety to the minds of workers . . . and management . . . in fertilizer plants throughout the nation. The benefits, both economic and humanitarian, must be made known so that the entire fertilizer industry will know that safety pays. The very atmosphere in plants should be charged with safety consciousness.

With this goal in mind, it is not difficult to see that in considering this subject we are dealing with the real fundamentals of the matter. Publicity. Advertising safety. Selling safety.

To accomplish these ends, it will be necessary to utilize every possible medium of information available to reach the people whom we wish to influence. This effort should include not only the familiar posters around the plant but use of news-

Making safety known to everybody . . . from top management on down . . . is a job for publicity. It can be ideal medium for safety education.

papers, radio, perhaps television and the employment of plant public-address systems if such are available.

Perhaps the fertilizer industry needs a sort of "Ten Commandments" of safety against which various managements might measure themselves. It would probably turn out in many cases like the man who, while listening to a very forceful sermon on the ten commandments, began to squirm and feel uncomfortable. His conscience hurt as the rules were laid down one by one, but finally, he perked up and said to himself, "Well, anyway, I've never made any graven images."

Upon hearing the safety message, there are bound to be quite a number of fertilizer plant managers and owners who will find their operations weighed in the balance and found wanting; their plants considerably on the hazardous side. Like the sermon hearer, they may defend their positions by saying, "Well, anyway, I never let a man get hurt on purpose."

Contacting Industry

THOSE who carry the responsibility of publicizing safety must somehow reach the entire industry. Their message must be one that points out the mistake of letting safety take

an incidental role in fertilizer manufacture and at the same time must overcome apathy and inertia and bring about an honest-to-goodness reform. How can this be done?

In the first place, publicity must be geared to the wants and needs of the people involved. This is not easy. The commodity being sold is not a washing machine nor a television set nor anything of physical nature. It is an idea, and therefore intangible; a process of education to make a particular group aware of hazards to be faced in connection with their daily work; and also how to take steps to avoid them.

The purpose of any publicity, or advertising message, is to get the prospective "buyer" to see and understand the real qualities of the thing being sold. The language used must be completely intelligible to him and it must make sense.

With this objective in view, how does one do something about it? It must be remembered that people with different backgrounds will not respond in the same way to a given stimulus. Persons engaging in publicity must recognize a few basic psychological facts in developing a program.

Anyone who ever visited an art gallery in a group will remember how certain pictures would bring out exclamations of praise from one or two persons while the remainder

*Paper by LAWRENCE A. LOUG, Editor, AGRICULTURAL CHEMICALS, New York, before Virginia Safety Conference, Roanoke, May 8, 1953.

would pass by without a second look. The same is true with a safety poster or other safety advertising.

To a man who has had a close call recently with a slide in his fertilizer plant, a poster warning of such hazards will ring a bell in his consciousness. To his fellow-workers, who lack his personal experience, such a scene might rate merely a shrug of the shoulder.

A Plan Of Action

ACTUALLY, a discourse on publicity seems to be worthless unless something of practical nature comes out of it. So far, it has been determined that safety publicity is desirable and that something ought to be done about it. In view of this, here are a few suggestions which may or may not be practical in every situation, but some of which should prove helpful in many cases.

Media

WHAT are the media, or various outlets for advertising fertilizer safety? Actually, the field is virtually unlimited, since in the final analysis, just about anything can become a medium for carrying a message. You can write the words "BE CAREFUL" with chalk on a shovel, and the shovel thereupon is a medium. The single word, "THINK" has been used widely with only a piece of cardboard as a medium. Safety-minded people may become media themselves by merely talking-up the subject; a very effective means.

There are of course more conventional media through which the safety message gets to the public. The local newspaper or newspapers are usually willing to write up the safety activities of a plant, providing there is a story to tell. When was the last time your plant or its activities were written up? Too often, the only time a fertilizer plant is ever mentioned in the town Gazette is when some hot-rod driver runs down a workman who failed to step lively to get out of the way. Or, perhaps, some civic committee is after the company's hide for alleged contamination of the town's atmosphere.

Unless the local editor is grossly short of his knowledge of what a safety program can do to benefit his community, he should be more than willing to carry stories about local efforts to cut down both the number and severity of accidents. At least, the local paper should be informed of any real action to improve conditions. In this connection, the most positive way to seek publicity on the local level, is to have a representative of the company (preferably the safety director) contact the paper and tell the city editor about the safety program.

It is news when a safety drive is announced and the news value continues to grow as the plant's safety efforts are continued. Then too, when a good safety record is earned over the period of a year, two years, or any other unit of time, this, too, should rate good local newspaper coverage.

Such publicity helps in a number of ways. Your man who operates the bagging machine, for instance, will read the paper at home and will be proud to point it out to his wife and say, "Look, Mag, I helped do this! We haven't had a lost time accident in the plant for a year!" It is easy to see how this feeling of accomplishment can inspire workmen to continue in their efforts to work safely.

In addition to being read and talked about by the company's employees, a valuable by-product is community good-will which is likely to be enhanced to a considerable degree. Lasting benefits may be realized from the fact that people in your town, many for the first time, are exposed to seeing the better side of the fertilizer industry. Some may gain a more friendly feeling toward that dusty factory down by the railroad tracks. Printers' ink should be an important ingredient in any safety promotion program.

If a local radio station features community news and is not above giving a pat on the back to business enterprises that are promoting safety, this medium might also be used to publicize your efforts. The same results as outlined above are

possible through allowing the public to hear favorable things about your plant, as well as reading about them.

Sell Management First

LEST we get the dump cart before the horse, it must be remembered that this type of publicity isn't possible unless certain other things have been accomplished first. Before there is any news for the paper regarding safety in any fertilizer plant, the management itself must become "sold" on the idea. And how does publicity reach this group?

Management for the most part reads the trade press. . . magazines published expressly for business men in the field. Most of these publications during the past two or three years, have carried a considerable amount of news, pictures, and editorial material about the value of better safety records in plants.

Leaders in the trade have been urged in many ways to attend local, state, regional and national safety meetings and this effort has apparently been fruitful. Quite a number have indicated that their interest in safety was first aroused through trade paper announcements and stories.

To add to the over all impact, rather comprehensive reports of various conferences are usually published so that those who were unable to attend in person might gain benefit from reading about what various experts had to say on the subject. When papers of outstanding merit are presented at safety meetings, they frequently are published as articles in the trade press. This, we believe, is helpful in getting the basic message across to the men at the top.

Publicity of this type causes owners, managers and superintendents to begin thinking of safety in terms of their own situations. It is of course well known how the attitude of management in general has changed during the past few decades . . . how it has long since come to recognize that the welfare of employees is closely connected to that of the company; that they tend to rise or fall together. And beyond this consideration is the fact that safety actually pays off fin-

ancially in many cases. The trade press has carried stories to indicate this fact as illustrated in the case of at least one fertilizer company which has received rebates amounting to many thousands of dollars from insurance companies. When a safety program reduces accident frequencies and their severity, compensation losses are greatly reduced, also.

Safety news as carried in the trade press is aimed at the higher echelons of management, but that is where the movement toward safety must begin. Once management is convinced that a safety program in its particular plant will save both money and misery, the program can be set up solidly. Naturally, without the blessings of company officers, neither safety nor any other program is very likely even to be thought of, not to mention being carried out.

Selling Management

ONCE the publicity program directed to the top level has done its job, what then? Management is sold, so where do we go from here?

Just as advertising has been instrumental in reaching the eyes and ears of men on the policy-making level of the industry, so it must be used *BY* them to carry the message on further. The story must filter down through the ranks like rain penetrates to the sub-soil.

There are numerous ways of accomplishing this. The exact prescription for any given problem will depend of course upon the size of the plant and other factors. These include the past history of the labor-management relationship. If relations have been reasonably harmonious over the years, there should be no great difficulty in gaining success in publicity. The workers in this case should have no particular suspicions about ideas that come from above. Unfortunately, the contrary may be true where misunderstandings have been allowed to fester over the years.

In fact, a sincere safety effort can be the means to reach the employees, since the program is basically an *unselfish* one in which the workers themselves stand to benefit. The pub-

licity used can emphasize this fact, pointing out that management's benefits are more indirect than those of the employees.

Assuming that the men in the plant are not downright hostile to anything and everything suggested by their employers, safety can be kept before the men so that its principles will soak in. Some companies print regular safety bulletins under various names and circulate them among the employees. This printed matter carries case histories of accidents . . . what caused them, the extent of injuries suffered, and appraisal of how future accidents of this nature might be eliminated.

Such bulletins have proved helpful in educating not only the employee himself, but also members of his family. This is accomplished by mailing the bulletin to his home and being sure that the paper will contain items of interest to children. Did you ever see a child uninterested in looking at cartoons? Gimmicks of this kind attract not only the youngsters, but the older folks as well and often result in family conversations about safety. That safety-consciousness in the home is important is underlined by the tremendous numbers of accidents which occur outside working hours.

One publicity stunt used occasionally with good results, is the sponsoring of essay contests for children of fertilizer plant employees. One such contest was on the subject of "Why My Daddy Should Work Safely." You don't suppose that little Jackie or Mary worked on their essays in silence, do you? Of course not!

You can bet that these fertilizer men were bombarded on all sides every evening for weeks as the kids sought ideas to bring into their writing. Probably the dads were happy when essay time was over, but the net result was that both the worker and his family were all much more safety conscious during that time and after.

Although some of this general information has been touched on in previous papers and at numerous safety meetings of the past, the sub-

ject of publicity is so very broad that it necessarily overlaps a good many corners and fringes of other fields. Yet, no discourse on safety publicity could be complete without pointing out the great value of posters in plants and elsewhere.

There are posters of all kinds, shapes, sizes and colors. Some are home-made, others hand-lettered, and still others produced by the National Safety Council or other agency interested in the subject.

Messages carried by these posters vary widely . . . but the publicity story carried by all of them is vital. Their profundity may range from the admonition of "Work Safely", to "The life you save may be your own."

Fertilizer workmen as a rule are hardly readers of Plato or Shakespeare and long-worded posters won't penetrate very deeply into their consciousness. But if you put up a semi-humorous picture of a cartooned character stumbling along carelessly carrying a box of dynamite caps, you'll have the immediate attention of all lookers!

There is a catch to the poster plan of publicity, however. The most common pitfall is for a firm to get a lot of enthusiasm worked up for a safety education program, put up a bunch of posters and then just leave them! The National Safety Council's advice is to change posters frequently! Posters not intended for permanent display should be changed once a week. . . and if a bulletin board is available, adding to or changing at least part of the material, should be done every day.

There are other suggestions for the plant which wishes to use the poster plan in its publicity program. Such posters must be selected for variety. The best plan is to select a balanced supply of posters in a variety of sizes. Subject matter should be varied, and carefully thought out. Wise selections should include a balance between the thought-provoking and the inspirational types; the serious against the humorous; the long-message kind against the shorter "flash" types.

(Turn to Page 115)



Above: Officers of the Pacific Branch: Arthur W. Lindquist, B.E.P.Q., U.S.D.A., Corvallis, president-elect, Stanley F. Bailey, Univ. of California, Davis, retiring president, and Leslie M. Smith, Univ. of California, Davis, secretary-treasurer. The newly elected vice-president of the section, John Steinweden, was not at the meeting.

Early announcement of F. D. A. tolerances; passing of Miller Bill requested at Tahoe meeting of

Pacific Branch

ADOPTION of a law such as the revised Miller bill to govern insecticides, and the prompt issuance of insecticide residue tolerances, so growers and the insecticide trade may have some idea of where they stand, were urged on the government representatives directly concerned in a resolution passed by the membership of the Pacific Branch of the Entomological Society of America, meeting at Lake Tahoe, Calif., June 23, 24 and 25.

The meeting attracted a large group, with registration running above 300. Officers were elected for 1953 as follows: chairman, A. W.

Lindquist, B.E.P.Q., U.S.D.A., Corvallis, Ore.; vice-chairman, John Steinweden, regional coordinator, State Dept. of Agriculture, L.A.; and secretary-treasurer, re-elected for another 3-year term, Leslie M. Smith, Uni-

versity of Calif., Davis. R. D. Eichman of Stauffer Chemical Co., Portland, was named as a new member of the executive committee.

Apart from the paper reading sessions, interest centered in a series of panels which discussed: the development of new insecticides; cooperation between research workers, extension service and industry; control of ectoparasites on livestock; and absorption and translocation of insecticides in plants.

Dr. Charles E. Palm, president of the Entomological Society of America was the first speaker at the opening session Tuesday morning,

Below: The Panel which considered "The Evolution and Development of a New Insecticide": (from l. to r.) R. H. Wellman, Carbide & Carbon Chemicals Co., Yonkers, N. Y.; W. M. Hoskins, Univ. of California, Berkeley, (moderator) F. C. Bishopp, B.E.P.Q., Washington, Allen B. Lemmon, Calif. Bur. of Chemistry, Sacramento, M. P. Jones, U. S. D. A., Washington, F. R. Barron, Jr., Amer. Cyanamid Co., New York, A. J. Flebut, Niagara Chem. Div., Food Mach. & Chem. Corp., Richmond, Calif., and S. B. Freeborn, Univ. of Calif., Davis.



Entomologists

June 23, outlining in his address some of the objectives of the new national society which he indicated already numbers some 2,400 members. He prefaced his remarks by giving credit to the many members who have helped in the past work of building the association, mentioning particularly Dr. E. N. Cory who has long served as secretary and business manager, and Dr. Peairs and Dr. James, editors respectively of the *Journal of Economic Entomology* and the *Annals*. Dr. Peairs, incidentally, has recently had to retire as editor of the journal for reasons of health, and is being succeeded temporarily by Dr. F. W. Poos of the B.E.P.Q.

Dr. Palm indicated that a committee of the interim board composed of Dr. Linsley, Dr. Ross, and Dr. Knipling will shortly offer a slate of candidates for the position of permanent secretary of the E.S.A.

Attention was called to the approaching 100th anniversary of the first appropriation of public funds to provide entomological service. In 1854, Dr. Asa Fitch was appointed on funds provided by the New York Legislature to study the control of insects injurious to agriculture, and Townsend Glover was appointed federal entomologist on funds provided by the U. S. Congress. The approach-

ing 100th anniversary of these two events will be publicized, with plans

In the Photos

Top: The panel on cooperation between research workers, extension service and industry: John E. Swift, Univ. of California, Berkeley, (moderator) L. A. Carruth, Univ. of Arizona, Tucson, G. F. MacLeod, Sunland Industries, Fresno, R. D. Eichman, Stauffer Chem. Co., Portland, P. O. Ritcher, Oregon State College, Corvallis, Mike Swoboda, New Mexico Agr. Extension Service, and G. F. Knowlton, Utah State Agr. College, Logan.

Second photo: W. Scott James, Pittsburgh Agricultural Chemical Co., R. J. Both, Hercules Powder Co., Cameron Siddall, Penn Salt Mfg. Co. of Washington, Tacoma, and Dr. K. E. Maxwell, Agriform Co., Riverside, Calif.

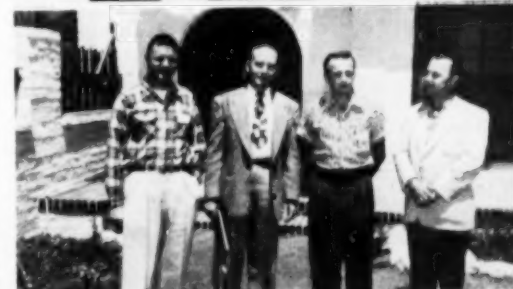
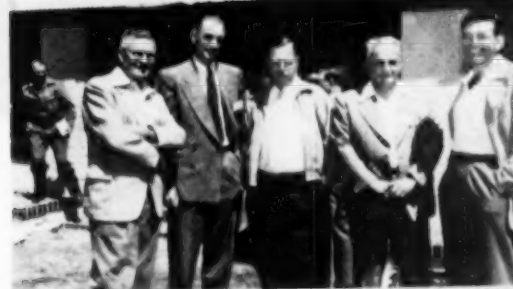
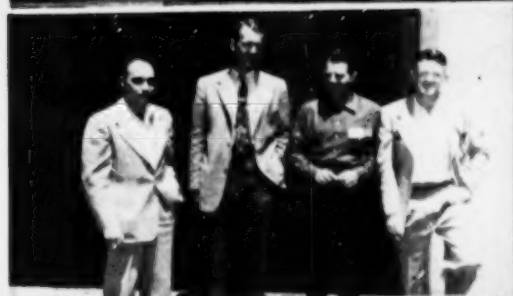
Third photo: J. K. Primm and M. G. Swingle, E. I. du Pont de Nemours & Co., J. F. Kagy, Dow Chemical Co., J. E. Bussart, Velsicol Corp., and C. C. Alexander, Geigy Co.

Fourth photo: Dr. Charles Palm, Cornell Univ., Ithaca, N. Y., president of the Entomological Society of America, G. P. MacLeod, Sunland Industries, Fresno, David C. Hall, B.E.P.Q., U.S.D.A., and R. F. Smith, University of California, Berkeley.

Fifth photo: H. F. Pierce, Hercules Powder Co., Los Angeles, C. A. Ferris, Geigy Co., Fresno, Tom Heffernan, Producers Cotton Oil Co., Fresno, and Clifford C. Parke, American Cyanamid Co., Fullerton, Calif.

Sixth photo: A. F. Kirkpatrick, American Cyanamid Co., Oakland, Dr. E. E. Ivy, B.E.P.Q., College Station, Roy E. Campbell, B.E.P.Q., Whittier, and I. H. Neal of Hercules Powder Co., San Francisco.

Bottom photo: Paul F. Dresher, American Chemical Paint Co., San Jose, R. W. Underhill, Dow Chemical Co., San Francisco, chairman of the arrangements committee, and Ed Litooy, Colloid Products Co., San Francisco.



for the celebration proceeding under the direction of David Hall of the information section of the B.E.P.Q. in Washington. A dinner is planned at which important public figures as well as leaders in entomology will speak. A commemorative stamp will also be issued and maximum advantage will be taken of other opportunities to achieve publicity for the work of entomologists.

Dr. Palm also referred to the suggestion of the Hoover Commission that the B.E.P.Q. should be broken down into service units, with commodity groups, and that regulatory and research activities should be separated administratively. He noted that the Entomological Society of America has expressed to the Secretary of Agriculture its view that the welfare of the public can best be served through one strong functional administrative unit of entomology and plant quarantine in the Department of Agriculture.

Turning to the responsibilities which entomologists and pesticide manufacturers have to the public, Dr. Palm observed that "the control of vectors of disease pathogens and the safe use of pesticidal chemicals for insect control on or in feed crops constitute two major tasks for entomologists. Our opportunity for service in these fields is greater now than ever before. Along with the research and control phases of these operations, our society must make certain that the public is kept properly informed without being unduly alarmed by scare stories. Careful attention must be given to proposed legislation which in an effort to protect the public health, might cause undue restrictions on food production. We still need food and we need pesticides to produce it."

Panel— Development of New Insecticides

ANOTHER feature of the first day's session was the panel discussion "The Evolution and Development of a New Insecticide" with W. M. Hoskins, University of California, Berkeley, as moderator and including representatives of various government and state agencies as well

as representatives of industry. It was emphasized by various panel members that the development, testing and successful marketing of new insecticides depends to a high degree on team work.

The preface to the discussion pointed out that

The introduction of a new insecticide involves far more than the discovery of a chemical that will kill injurious pests and the production of it on a commercial scale. The manufacturing process involves large scale chemical and engineering procedures often of a pioneer type. A distributing and selling organization, if already in existence, must be made aware of special conditions and an educational program for farmers must be carried out through field agents and extension specialists. State and federal regulations for licensing and transporting of chemicals are strict and require precise information on the health hazards attending the manufacture and use of insecticides and the residual contamination on treated foodstuffs. If all these obstacles are overcome, highest quality business judgment is needed to determine if in the long run the introduction of a new chemical is justified on economic grounds.

F. Ray Barron, Jr., American Cyanamid Co., New York, reviewed the various steps that must be taken in testing a new insecticide before it is ready to be placed on the market, listing the screening tests, toxicological studies, refinements in methods of production, study of most effective technique in formulation, development of methods of analysis, flavor studies, determination of residues, etc. Then lengthy field tests must follow under a wide range of conditions.

Costs Discussed

R. H. WELLMAN, Carbide & Carbon Chemicals Co., N.Y., discussed the cost of this sort of testing program, emphasizing that as a matter of practical economics, the one successful product must be charged not only with the cost of its own development, but also the cost of the thousands of other compounds tested along the way, and discarded for one reason or another. For every two

Pacific Branch, E. S. A., Resolution

WHEREAS:

the rapid finding of chemicals which have useful properties in protection of animals and plants shows no sign of lessening, and

WHEREAS:

it is generally agreed that new pesticide chemicals should not come into general use until suitable restrictions on the amounts remaining on foodstuffs have been established, and,

WHEREAS:

the expensive and time-consuming procedure of showing necessity for use by public hearing cannot be used with sufficient frequency, and

WHEREAS:

three years after a long and expensive hearing, no tolerances have been announced, be it

RESOLVED:

that the Pacific Branch of the Entomological Society of America in business session on this 25th of June, 1953, urges upon all appropriate agencies and authorities that this unsatisfactory condition be improved as speedily as possible by the adoption of laws or regulations which will provide for any interested party to petition for the establishment of a tolerance for a pesticide chemical, for the Secretary of Agriculture to certify regarding its usefulness for the specified purpose, for the securing of impartial advice from experts in the subject matter, and for the prompt issuance of a tolerance, with the right of any interested party to file objections and to have recourse to the established courts.

thousand possible insecticidal compounds tested, he indicated, only one comes through into commercial production and use. He estimated the cost of developing a new insecticide as upwards of a million dollars. For a more lengthy discussion of the subject see AGRICULTURAL CHEMICALS for September, 1952 (Pgs 32-34).

Dr. F. C. Bishopp, B.E.P.Q., U.S.D.A., Washington, reviewed the contributions which federal agencies make to the development of new insecticides. The U.S.D.A. does extensive test work on such new products in its laboratories at Beltsville, Orlando, Anaheim, Kerrville, College Station and Ankeny. Dr. Bishopp emphasized that the requirements for the ideal insecticide are many and severe. "In the minds of some people, it must kill all bad bugs and not injure the good ones", he said. "It must not injure nor discolor the plant or animal to which it is applied, nor should it have an objectionable odor. Neither must it irritate the eyes and nose and it must not be so toxic as to require the applicator to use a mask or protective clothing.

"It must not cause off-flavor nor off-color of crops, even when used at many times recommended strength. When applied to soils it must remain effective against insects for years, yet not be injurious to the plants grown therein.

"It must not kill fish nor wildlife, nor damage application equipment. It must be a persistent insect killer, but must not remain on the harvested crop as a residue. The insecticide must mix readily with water, yet not wash off plants or animals too easily. It must be compatible with various other chemicals used in crop production.

"Insecticides must not have a tendency to develop resistance to toxicants among insect pests. They must not be stored in animal tissues or be excreted in milk. They must keep perfectly in storage for at least two or three years and must not burst out of the containers. Above, all, they must be economical.

"This constitutes a big order.

"Yet some people maintain

that with the many insecticides now on the market, we need go no farther with research and development in that field. Have we met all the above requirements? Of course not . . . and we never will, but there is definite room for improvement in the basic materials and in their formulation, cost and safety."

Discussing the subject of insecticide toxicity, Dr. Bishopp commented that in his opinion, undue restriction of the experimental testing of toxic materials can retard unnecessarily the development of new insecticides. He also indicated his feeling that perhaps there has been overemphasis on taste panels. In his opinion, minute variations in the flavor of treated agricultural products are in many cases unimportant.

Dr. S. B. Freeborn, University of California, Davis, in discussing the contribution of state agencies to the development and testing of new insecticides indicated his belief that much so-called research work in the insecticide field is unproductive and that the endless testing of various insecticide formulations accomplishes little. He emphasized that entomology is still the study of insects and cited several examples to demonstrate that insecticides cannot be expected to perform efficiently unless full knowledge exists about the structure and habits of the insect. It might be more productive, Dr. Freeborn asserted, for entomological researchers to spend more of their time studying why and how insecticides kill, rather than to continue the present emphasis on lengthy testing of formulations.

Dr. Allen B. Lemmon, Calif. Bureau of Chemistry, Sacramento, in discussing registration and regulation of insecticides, commented on the need for extensive data on performance before new products can be granted registration. He also indicated that it is his concept of the function of a regulatory agency to anticipate troubles that may arise in connection with use of new insecticides and to guard against them in advance. He cited as an example the off-flavor problems that accompanied use of BHC, and which have since

made regulatory agencies and insecticide users as well, rather sensitive on the off-flavor question.

Poorly trained applicators can cause a great deal of trouble for the insecticide industry, Dr. Lemmon reminded. Refusal of many users to read labels and follow directions is another common cause of trouble. Another possible danger in connection with insecticide use, which is currently being given added attention, is the hazard to fish. Dr. Lemmon mentioned complaints of toxicity to fish that have been reported recently in California in connection with use of various insecticides on rice.

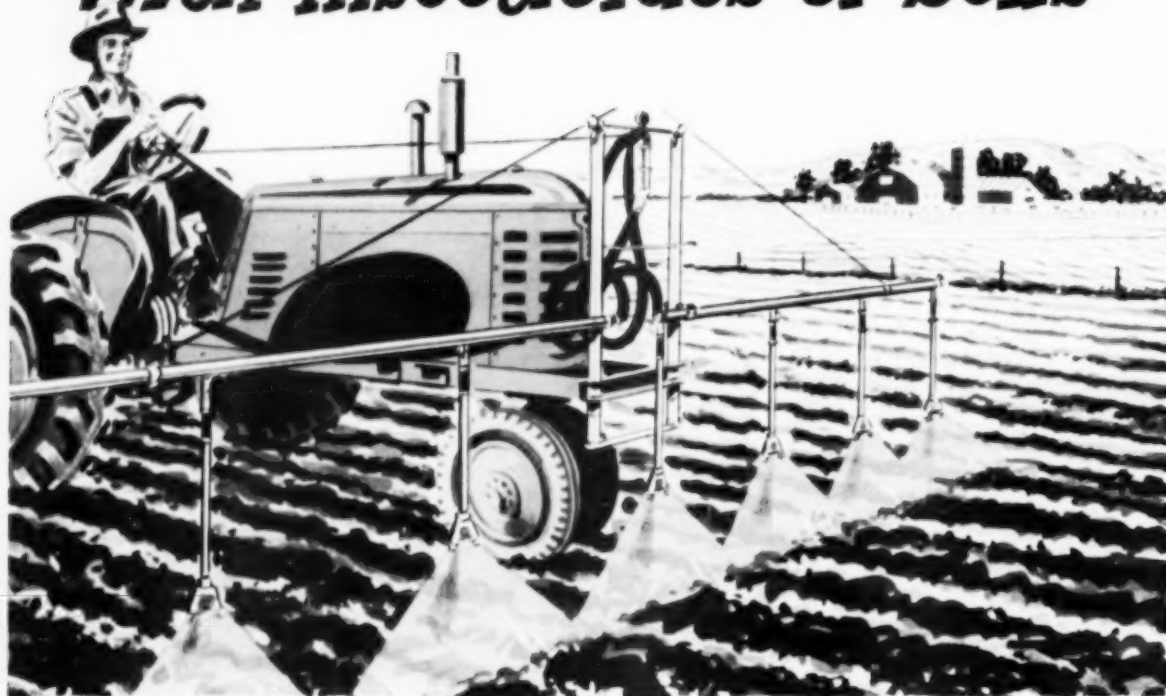
M. P. Jones, extension entomologist with the U.S.D.A., Washington, D. C., discussed the role of the extension service in developing new insecticides. He emphasized the importance of showing the farmer how to use new products, pointing out that it is very important to see that the new product gets a fair test under practical conditions. The final and most important screening of any new product, Mr. Jones emphasized, must be done on the farm. Use is normally restricted, of course, to a small portion of the crop until the product has been proved safe and efficient.

Mr. Jones also stressed the importance of seeing that the agricultural insecticide dealer is familiar with new products and how they should be used.

A. J. Flebut of Niagara Chemical Division, Food Mach. & Chem. Corp., Richmond, California, discussed commercial sales. He prefaced his remarks by the observation that progress reports issued by extension workers sometimes have the effect of recommendations. He warned that experiment stations must be exceptionally careful in their comments for this reason. He also called attention to the importance of the formulator in the success of any new material. The product as given to the formulator may still have "bugs" in it and present problems which the formulator must solve before effective and safe use can be counted upon. A good

(Turn to Page 102D)

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**20th Anniversary Program Nears
Completion for September Meeting of**

N. A. C. Association

THE National Agricultural Chemicals Association will initiate observance of its 20th Anniversary during its annual meeting at Spring Lake, New Jersey, September 9, 10, 11, the group has announced. Headquarters will be at the Essex and Sussex Hotel, but in order to accommodate all the representatives, facilities of the Monmouth Hotel will also be used.

The first day's agenda calls for an address by NAC president Arthur W. Mohr and a report by the executive secretary, Lea S. Hitchner. Mr. Mohr is president of the California Spray-Chemical Corporation of Richmond, California. Presiding officer will be NAC vice president, Paul Mayfield, general manager of the Naval Stores Department of Hercules Powder Company, Wilmington, Delaware.

J. Earl Coke, assistant secretary of the U. S. Department of Agriculture, will address the group on the opening day, making the first opportunity for the association to be addressed by an official of the new administration. Brigadier General Joseph F. Battley, president of the National Paint, Varnish and Lacquer Association will discuss services that a trade association can bring to its members. Richard O. White, U.S. D.A. Registration Division, will point out some of the principal problems involved in the registration of pesticides. Mr. White is with the Production and Marketing Administration.

A reception for members and guests will be held Wednesday evening.

The Thursday morning session will be devoted to informal discussions with participation from the floor. A discussion of technical problems is

being organized by the Technical Advisory Committee. Dr. L. Gordon Utter, Diamond Alkali's Organic Chemicals Division, is chairman of the committee.

NAC's 20th Birthday

THE NAC Association was organized in 1933 as the "Agricultural Insecticide and Fungicide Association," by some fourteen members of the pesticide industry. Originally formed to operate under the then-existing NRA code, the Association was later continued and supported by contributions from members of the industry.

The first president of the Association was Lea S. Hitchner of Washington, D. C., who later became executive secretary when the by-laws of the Association were changed so that the presidency could be held by members of the industry. Preceding Arthur W. Mohr, current head of the Association, were these presidents: Ernest Hart, executive vice-president, Food Machinery & Chemical Corp., New York; George F. Leonard, vice-president, Tobacco By-Products & Chemical Corp., Richmond, Va.; Joseph B. Cary, executive vice-president, Food Machinery & Chemical Corp., San Jose, Calif.; Warren H. Moyer, vice-president, Chipman Chemical Co., Inc., Bound Brook, N. J.; and Mr. Hitchner.

The regular annual meeting of the Association is held during September, after the current season's business activities have largely ceased. In the spring of each year, however, the Association holds a second meeting in various sections of the country. This allows representatives to attend at least one meeting of the Association each year without the necessity of traveling great distances, since the Association's activities are national in scope.

Special observance of the initiation of the 20th Anniversary Meeting will take place during the convention at Spring Lake, New Jersey.

Fertilizer-Pesticide Panel

THE panel of experts who will serve to spark the discussion of fertilizer-pesticides mixtures includes: Dr. M. D. Farrar, Head, Department of Entomology and Zoology, Clemson Agricultural College, Clemson, South Carolina; Dr. Rodney C. Berry, State Chemist, Division of Chemicals, Department of Agriculture, Richmond, Virginia; Dr. C. C. Compton, Julius Hyman Div., Shell Chemical Corp., Denver, Colo.; and Eugene Ordas, Velsicol Corporation, Chicago. A fifth panel member is to be announced later, the Association says.

Concurrently with the technical discussion, members of the Association will have the opportunity to ask questions of the NAC staff and counsel and to make suggestions for the operation of the Association. Questions and suggestions will be accepted in writing prior to the informal session.

The annual golf tournament will be held Thursday afternoon and a banquet in the evening. Arrangements have been made for special dances and other entertainment each evening. Members will also have the opportunity to see movies and slides prepared by member companies for educational purposes.

Marketing Discussion

A DISCUSSION of the marketing of pesticides will be featured at the final session. W. Raoul Allstetter, vice-president, The National Fertilizer Association, will speak on the merchandising of chemicals for agricultural purposes. Dr. George L. McNew, director, Boyce Thompson

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SEQUESTRENE METAL COMPLEXES—These complexes are for the correction of mineral deficiencies. The iron complex has successfully corrected iron chlorosis of citrus in Florida. This complex and those of copper, zinc, manganese, calcium and magnesium are being applied experimentally throughout the United States.

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—A miticide that has been widely tested with excellent results. It is approved for use on ornamentals. Approval on food crops is pending.

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*"SEQUESTRENE" is the brand name for chelating compounds produced by Aldrich Chemical Company, a Geigy Company. Geigy Company, Inc., Insecticide Division, 89 Barclay Street, New York, N. Y., is the exclusive agent for Sequestrene metal complexes in the agricultural field.

Suppliers' BULLETINS

Field Trials Booklet

A new descriptive booklet has just been published by Dr. G. R. Townsend, Belle Glade, Fla., describing in detail facilities available for evaluations of agricultural chemicals in Florida field trials. The 12-page booklet gives complete information regarding services offered; methods and equipment, procedures; material requirements, etc. Copies are available from Dr. G. R. Townsend, Box 356, Belle Glade, Florida.

Safety Equipment Evaluated

"A Guide to Proper Respiratory Protection Against Principal Agricultural Chemicals" is the title of an eight-page mimeographed bulletin prepared by the Agricultural Department of Willson Products, Inc., Reading, Pa. The bulletin lists various pesticidal compounds, such as the arsenicals, chlorinated hydrocarbons, dinitros, etc., and recommends the type of equipment to protect workmen from their hazards. In addition to insecticides, the bulletin lists fungicides, herbicides, nutrient sprays, and defoliants. The bulletin is available from the company.

Alvey Issues New Booklet

Alvey Conveyor Mfg. Co., St. Louis, has just completed a new booklet which describes and illustrates the application of engineered package handling systems in a wide variety of industries. It shows how engineered conveyor systems have been geared to modern plant procedure to increase efficiency.

Copies may be obtained by asking for Form 2591. Write to

Alvey Mfg. Co., 9301 Olive Street Rd., St. Louis 24, Mo.

Bulletin On Emulsion Stabilizers

Unique stability can be imparted to oil-in-water emulsions through the use of a group of ligno-sulfonate surfactants, tradenamed "Marasperse", its makers state. These differ from conventional emulsifiers in that they have little effect on interfacial tensions. However, when used properly, they can render O/W emulsions very stable to the often damaging effects of temperature variations, pH changes, electrolytic contamination, and mechanical handling. Bulletin No. 119, issued by Marathon Corporation, Chemical Division, Rothschild, Wisconsin, describes the Marasperses, the manner in which they function, and the advantages inherent in their use.

Offers New Respirator

Economy and comfort are said to be features of a new, single-cartridge "Gasfoe" respirator being announced by Mine Safety Appliances Company, Pittsburgh, Pa.

All seven parts are independently replaceable, so that long service life is assured, the MSA announcement explains. The cartridge, containing treated charcoal fill, is designed to protect the wearer against nuisance concentrations of organic vapors, and certain acid gases having obnoxious but relatively harmless odors.

The lightweight, compact facepiece, of formable aluminum, is easily shaped by hand to fit the face contour. This feature, together with a soft sponge-rubber facepiece cushion, as-

ures face seal without uncomfortable pressure.

Full details on the Gasfoe are contained in a new bulletin, No. 1007-1, available from Mine Safety Appliances Company, Braddock, Thomas and Meade Streets, Pittsburgh 8, Pa.

Chemical Fly Trap Offered

A new sanitary disposable fly trap has been announced by the Agricultural Pest Control Co., Van Nuys, California. The device is reported to be suitable for use out-of-doors, and can be thrown away without cleaning or handling when full. Each unit will hold 25,000 flies, the makers state.

Descriptive literature is available from Agricultural Pest Control Co., 5732 Cantalope Ave., Van Nuys, Calif.

Offers New Fungicides

H. L. Woudhuysen & Associates, New York, have announced the availability of three new fungicides which have passed extensive tests and are now regarded as ready for commercial application.

"Mercusol," a solution of copper resinate and phenyl mercury salicylate, a grain seed disinfecting emulsion concentrate, adaptable to slurry treaters, is one of the group. Another, is "Merculine," a high potency mercury solution, an eradicant and protectant fungicide for grass and fruit disease control, for soil disinfection, root rot control and treatment of special seeds.

Third product is "Mercadmine," a combined cadmium-mercury solution, effective for the control of dollar spot on turf grass with residual protection.

Further information is available from the company, 17 Battery Place, New York, N. Y.

Anti-Caking Agents Described

Universal Detergents, Inc., Long Beach, Calif., has issued a new study of the use of surfactants in the manufacture of fertilizer by acidula-

(Turn to Page 115)

only

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gives you
all these
advantages:

* ORTHO Lindane is a truly amazing insecticide offering high potency, rapid action, and residual control. Kills more than 200 varieties of insects by contact, vapor action, and stomach poison.

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AGRICULTURAL CHEMICALS

WASHINGTON *Report*

by

Donald G. Lerch

Cornwell, Inc., Washington, D. C.
(Agricultural Chemicals Washington Correspondent)

THE National Agricultural Chemicals Assn. is demonstrating its statesmanship in foreign trade development which has considerable potential not only for company business but upon world commerce. Its committee, under the chairmanship of Norman E. Horton, Monsanto Chemical Co., is developing a 4 point program to expedite the spread of industry's products and technical knowledge on a business basis.

First objective is to strengthen liaison with those government and international agencies which obtain information on foreign requirements. Through this means it is believed that companies will be better able to program exports with a corresponding increase in efficiency of plant operation. Reason for this feeling is that the greatest percentage of pesticide exports are currently earmarked for overseas Public Health and Agricultural projects operated to a large extent by the governments of importing countries.

The second point of study by the NAC Foreign Trade Committee is the determination of a basis for establishing a product guarantee. Such guarantee is expected to protect the importer and assure that the pesticides delivered were up to specifications and suitable for the uses for which the materials were ordered. At the same time, it is held that such guarantee would serve the best interests of U. S. producers by screening out materials not in conformity.

A third area of work deals with active participation in world conferences relating either to the application

of pesticides or the technical phases of the industry. Conferences of the World Health Organization are cited as examples of the type of meeting where the committee can make constructive contributions. The committee could advise on product specifications in the light of technical knowledge and the productive capabilities of the industry. Since the machinery for international negotiations is still complex and cumbersome, a tangle over specifications can delay shipments past periods of peak demand.

Fourth, the committee feels that government officials should be better acquainted with the production capabilities of the industry so that decisions on export quota controls and other restrictive measures will be more realistic. Some restrictions may not be necessary. Industry leaders feel that the tremendous increase in plant capacity which has occurred, particularly within the last 3 years, documents the ability of U. S. producers to supply the growing demand at home and abroad.

Lea S. Hitchner, NAC executive secretary, has indicated that the Foreign Trade Committee can accomplish much to make industry's views on these points better known—making possible better service and a fuller use of its plants and know-how.

Many exchange students and farm leaders from overseas consider U. S. pesticides among the most important demonstrations of American friendship. Several young farmers from Europe recently remarked to their American audience that . . . "insecticides and the baby chicks from

the U. S. have done more good in my farm valley than anything I've known since I was a boy."

* * *

Importance of the foreign market business-wise is seen in the big jump in exports following World War II. In 1939, exports totaled a little over 60 million pounds at a price of nearly 5 million dollars according to U. S. census figures. By 1949, exports had risen to over 170 million pounds valued at 28.2 million dollars. Latest reports for 1952, show totals at nearly 250 million pounds with a price tag of 60.4 million dollars. This means over a 400% increase in volume and 1200% rise in dollar value during the 13 year period. Agricultural Chemicals will keep you advised of further actions in this recent NAC development.

* * *

There is mounting criticism of the Food and Drug Administration for delaying the issuance of residue tolerances. Food and Drug officials admit that the technical work was completed last year. The findings could have been issued before the election. Since there is no official announcement of why tolerances are being held under lock, there is growing speculation that internal politics and opportunism are dictating policy rather than action in the interests of protecting public health.

Certainly, many members of industry were impressed with the fairness and seriousness shown by those Food and Drug officials charged with the immediate responsibility for building a record upon which findings of fact could be reached. Industry extended its whole-hearted cooperation and submitted evidence totaling over 10 thousand pages. This demonstration of faith by the industry documents its interest in not only providing materials to assure abundant farm production, but to protect the public health.

* * *

Farm organizations are wondering whether tolerances will be issued in time to apply to next year's crop production. Both the Farm Bureau and the National Grange feel that any tolerances which require change in established farm practice should be made far enough in advance of the crop year to enable farmers to make plans accordingly. This raises the important question of allowing a sufficient time interval for an information program. At time of writing, neither organization has been

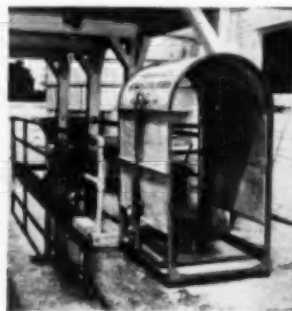
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...in the Automatic Sprayer



Photographed at Bray's Island Plantation, Yemassee, S. C.

Two ways of using automatic sprayers for effective fly control are shown here—between pastures (at left), and at the end of the foot-wash (below).



Developed by the Illinois Natural History Survey, the automatic sprayer technique is one of the fastest growing developments in the insecticide industry. Hundreds of sprayers have been installed from coast to coast, and the response from farmers indicates they like the convenience and effectiveness of this method.

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consulted. It is also apparent that BEPQ is not clear on Food and Drug plans.

Furthermore, with the continuing drop in farm prices, there is the feeling that farmers are entitled to the maximum period within limits of safety to make any required changes in practice. Since Food and Drug believed there was a question of public health back in 1950, and since no residue tolerances have been issued by mid-1953, farm leaders can be expected to insist upon this point which is a part of the official record.

Industry scientists are becoming more concerned over the "dating" of the material. Numerous technical developments have been made since 1950, and such data is not in the record. They are not anxious to do the job a second time. Here is a problem requiring positive action by the new Administration.

* * *

New military demands for nitrogen are worrying segments of the fertilizer industry. Nitrogen producers stand ready to provide all the nitrogen the military feels it needs. However, in view of the constant changes in estimates of military needs, caused in part by the unpredictable nature of the crisis in Korea and Europe, it is difficult to earmark nitrogen production with any degree of certainty.

There is some opinion in the industry which holds that if the military carries through with its new intentions, the amounts of nitrogen diverted from fertilizer may be in excess of production from new plants coming into operation and the normal 8 to 10% increase in farm demand. Current intentions call for doubling the amount of nitrogen for military use the final six months of this year compared with last year. A further step-up is scheduled for the first half of 1954, where needs are being programmed at three times the requirements for the same period this year. This could be reflected in fertilizer supplies as early as this fall.

* * *

The National Fertilizer Association reports growing interest among bankers in the value of fertilizer for

raising net farm income and protecting money already loaned for land and equipment. The nearly 3 year fall in farm prices is causing some bankers to re-examine their policies concerning farm loans. Pertinent material from NFA is assisting them in arriving at new policies. W. R. Allatetter, NFA vice-president is researching further material for this program on the west coast.

John F. Gale, NFA economist, is readying a new booklet intended for agricultural field leaders titled "This Is Fertilizer." Prepared in pictorial style, the booklet will give an illustrated report on the manufacture of fertilizer and the consumption by states during the 1910 to 1952 period. The story of industry research is also featured. Distribution will begin this fall.

* * *

W. G. Reed, Chief of USDA's insecticide division, advises members of the industry that they will receive official notification from his office of those products which by law must be re-registered under the Federal Insecticide, Fungicide and Rodenticide Act. He emphasizes that all products now registered remain registered until the company receives the official notice, giving thirty days for reply. This procedure is set up in the law and requires consideration for re-registration every five years. Mr. Reed plans to mail the forms on a quarterly basis, the last mailing having been made on June 30. It covers registrations through June 30, 1948.

There is some confusion arising out of the product number printed on the form. Those familiar with IBM machine operation will quickly see that the extra zeros before numerals are standard machine practice. Hence, discount prefixed zeros and you have your product number. He also requests that no products be submitted for re-registration until called for by his office. Complete information is given on the form and attention is directed particularly to item 5 concerning possible label changes. Cooperation of the trade, Mr. Reed says, will facilitate handling of this matter.

* * *

The fate of the Miller Pesticide Bill remains uncertain as of this writing. Hearings are scheduled to be held before sub-committee No. 2 of the House Interstate and Foreign Commerce Committee about mid-July.

Sub-committee chairman is Joseph P. O'Hara (R-Minnesota). Representatives of the pesticide industry, agricultural colleges and major farm organizations are expected either to appear or to file statements.

Concern is being expressed over the fact that five other bills are scheduled for hearing by the same sub-committee during the comparatively brief period it will sit. A number of the parties with primary interest in the new legislation are concerned as to whether or not sufficient time will be available to present their views adequately.

It appears that there is general agreement among interested parties on the major points of the Miller Bill. However noticeable differences of opinion are still reported on several specific points. It is questioned whether members of the sub-committee will have sufficient time to study all points of view.

The six bills scheduled for sub-committee hearings are: HR 2244 — Chemicals in Cosmetics; HR 2245 and HR 4901 — Chemical Additives in Food; HR 5055 — Food Standards; HR 2739 — Mis-branding; and HR 4277 — Miller on pesticides as above.

* * *

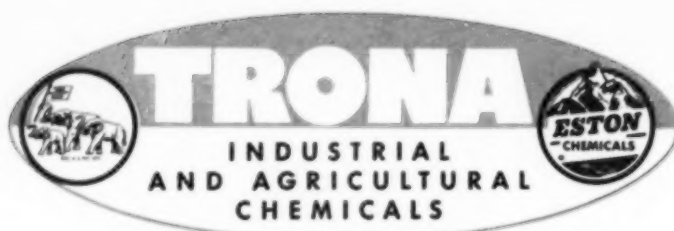
Louis H. Wilson, Director of Information, American Plant Food Council, is serving as a member of Secretary Benson's new Information Policy Advisory Committee. Recommendations for increasing the efficiency of USDA's information programs will be made during the second meeting of the Committee scheduled for September. The chairman is William B. Ward, Cornell University.

* * *

Important shifts in personnel are being made in BEPQ, led by the acceptance of a new post by Dr. F. C. Bishopp, who has for many years served as Assistant Chief of the Bureau, where he has won acclaim both at home and abroad. Dr. Bishopp's new work will be devoted to expanding the pink bollworm program to cope with the increasing threat of this pest. His new position is with the Oscar Johnson Cotton Foundation, as coordinator of all federal, state and industry sponsored research.

* * *

Dr. Edward F. Knipping succeeds Dr. Bishopp and brings with (Turn to Page 111)



New Light



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Monsanto Insecticides

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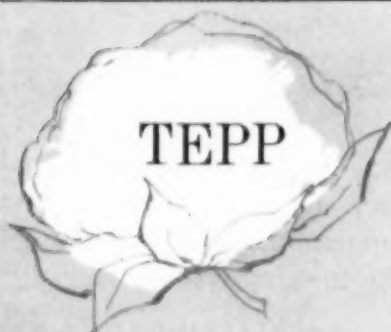
(Monsanto Niran*).—Highly useful against cotton, orchard, and greenhouse pests. Particularly effective in melon areas for cantaloup pests. Controls:

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|-------------------------|-------------------------|
| Clover mite | Blister beetles |
| Two-spotted spider mite | Mexican bean beetle |
| Pacific mite | Colorado potato beetle |
| Willamette mite | Spotted cucumber beetle |
| Strawberry spider mite | Striped cucumber beetle |
| Citrus red mite | Flea beetles |
| European red mite | Cabbage worms |
| Thrips | Corn-earworm |
| Leaf hoppers | Fall armyworm |
| Aphids—many species | European corn borer |
| Mealy bug | ... and other insects |
| Greenhouse whitefly | |



(Monsanto Santobane*).—Still the best control for pink bollworm. Also:

| | |
|------------------------|-----------------------|
| Boll weevil | Rose chafer |
| Corn-earworm | Japanese beetle |
| Cotton flea hopper | Peach-tree borer |
| Lygus bugs | Poultry lice |
| Colorado potato beetle | Housefly |
| Potato leaf hopper | Mosquito |
| Cabbage worm | ... and other insects |



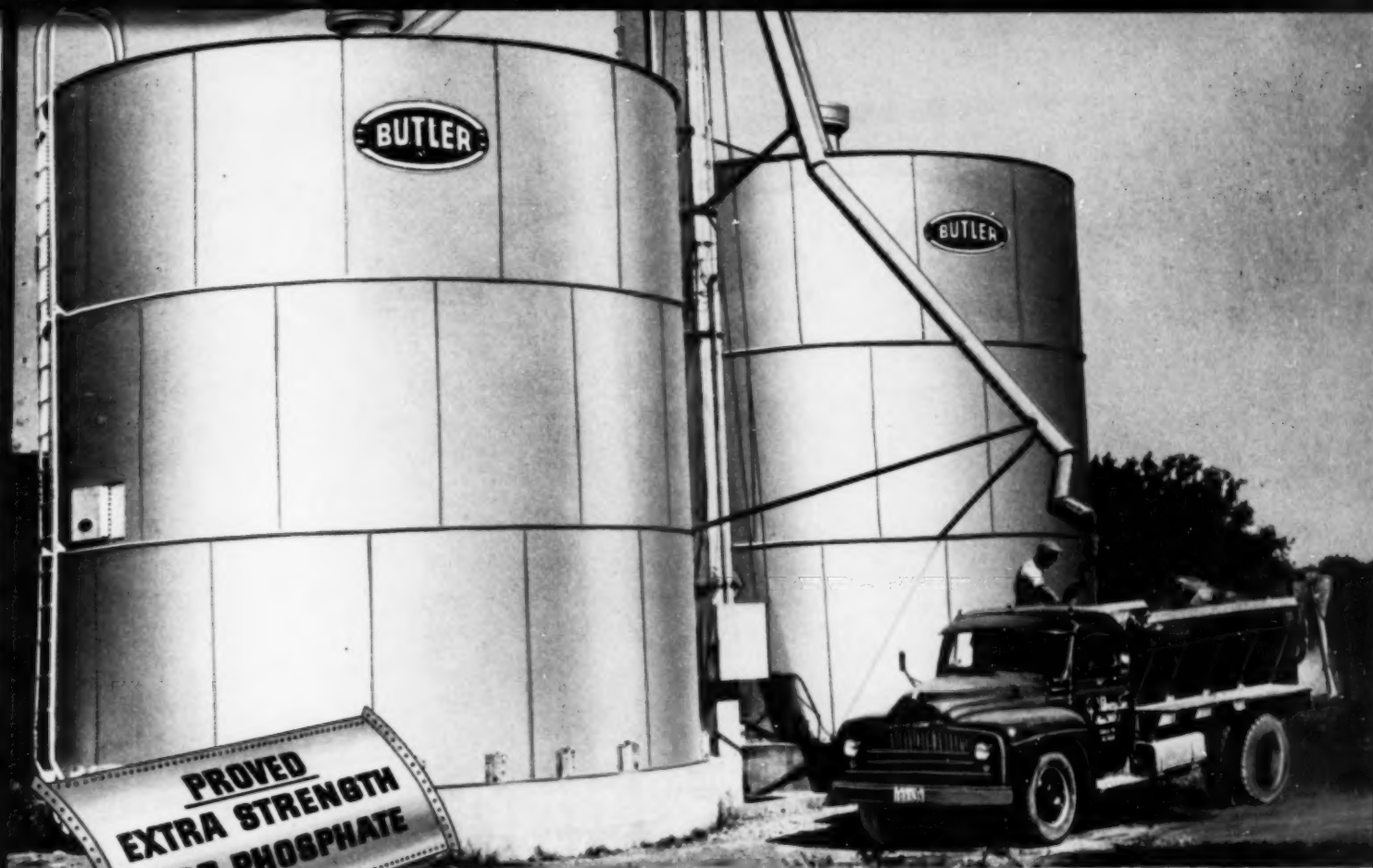
(Monsanto Nifos*-T).—Effective at low concentration. Controls:

| | |
|-------------------------|-----------------------|
| Two-spotted spider mite | Citrus mealybug |
| Pacific mite | Mexican mealybug |
| Citrus red mite | Greenhouse whitefly |
| European red mite | Lace bugs |
| Greenhouse thrips | Mushroom flies |
| Leaf hoppers | ... and other insects |
| Aphids—many species | |

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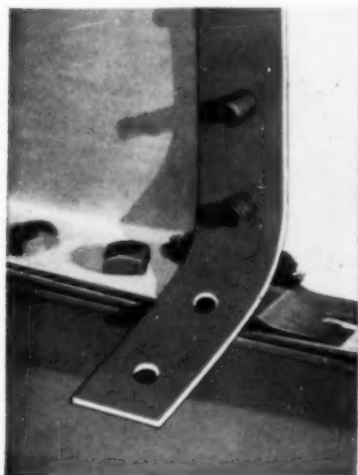
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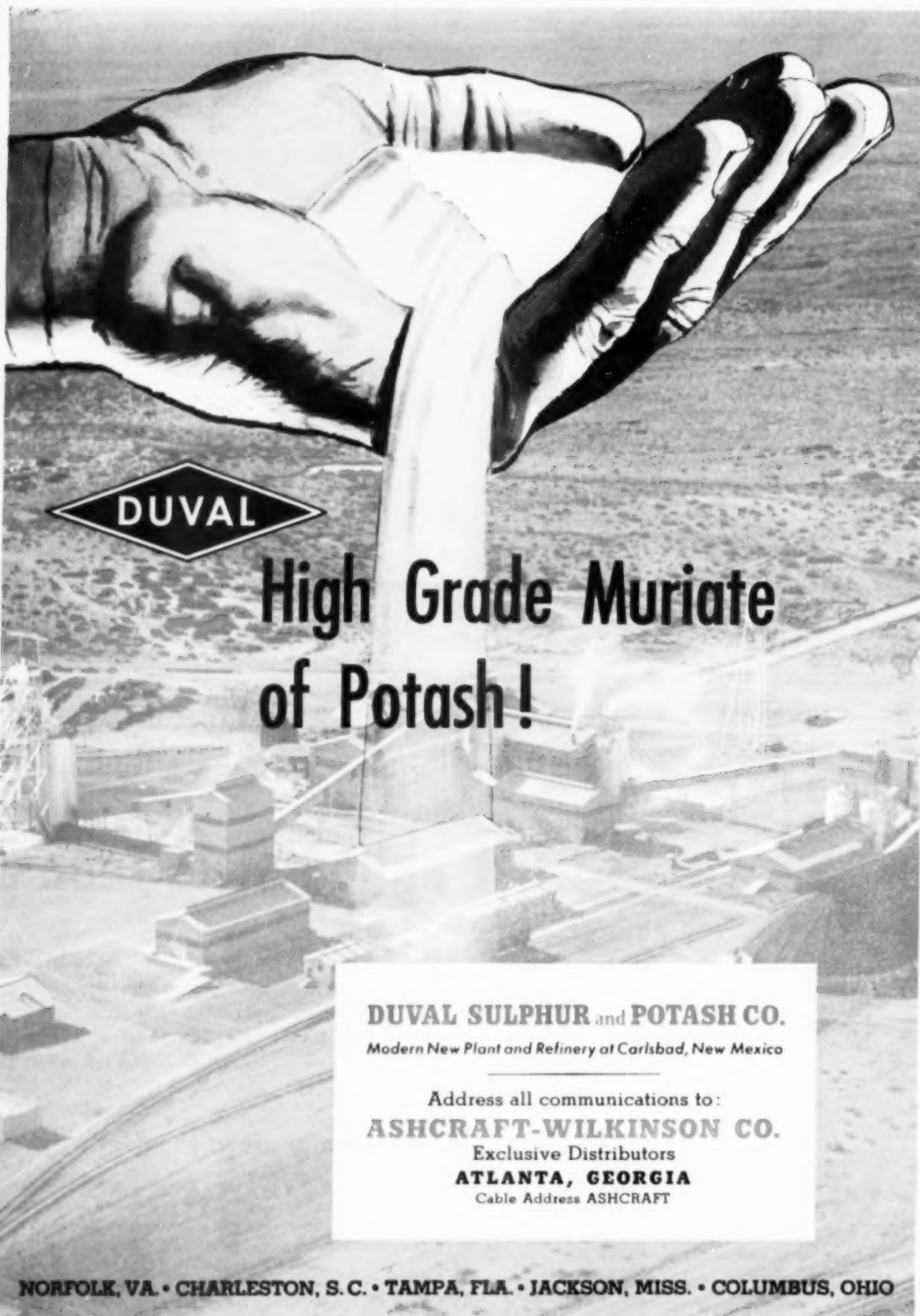
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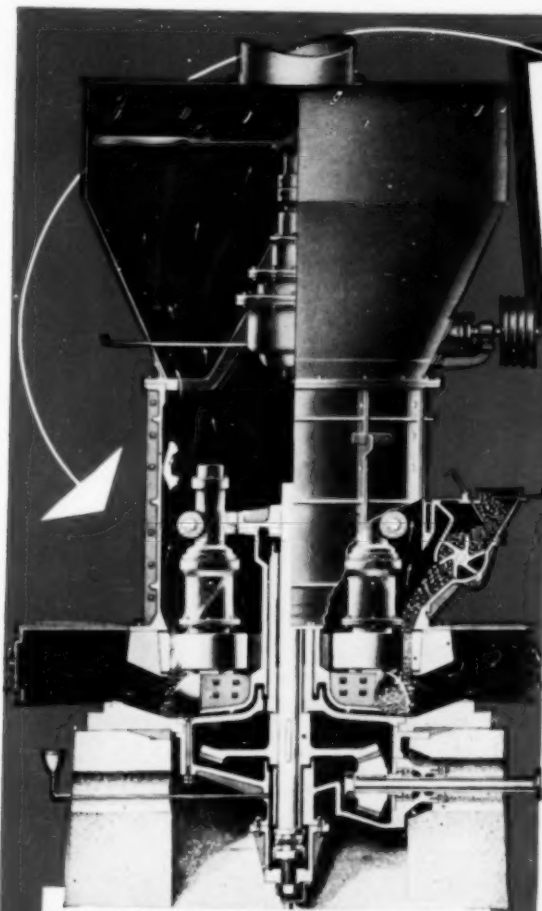
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Cross section of Roller Mill showing how material is ground by rolls rotating against bull ring, then air swept to separator which extracts fines and returns coarse material to mill for regrinding.

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...at lower cost**

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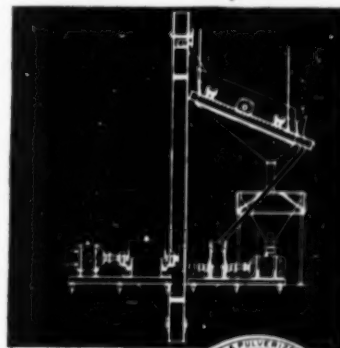
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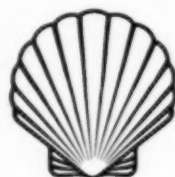
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AGRICULTURAL CHEMICALS

INDUSTRY *News*

Stitt and Easter Join Velsicol

VELSICOL Corporation, Chicago, Ill., has announced the addition of two men to its entomological staff. Stephen S. Easter and Lloyd L. Stitt have joined the company, according to H. O. Whamond, Velsicol vice-president.

Mr. Easter, formerly with the Food and Agricultural Organization of the United Nations, assisted in control activities in insect infestations of international importance. He was active in operations relative to grain storage in many UN member nations, making his headquarters in Washington, D. C. and Rome, Italy.

Mr. Stitt was previously connected with the USDA Bureau of Entomology and Plant Quarantine in Arizona. His work was primarily with alfalfa seed insects such as clover seed chalcid and its parasites and lygus bugs. These investigations were

on the ecology, biology and cultural phases of the control problems. He also worked on corn borer research in Indiana and on vegetable insect control in western Washington.

Canadian Ass'n. Formed

The Canadian Agricultural Chemicals Association has been formed by 14 companies, to foster progress and development of Canadian producers and distributors of chemicals for agricultural use.

Officers named by the founding group are J. H. D. Ross, Canadian Industries, Ltd., Montreal, president; A. H. Carter, Sherwin-Williams Co., Montreal, v-p; W. R. Geddes, N. American Cyanamid, Ltd., Toronto, second v-p; M. F. Anderson, Naugatuck Chemicals Div., Dominion Rubber Co., Ltd., Montreal, secretary; and K. B. Owens, Monsanto (Canada), Ltd., Montreal, treasurer.

Nixon Hercules Board Chmn.



ANSON B. NIXON

Charles A. Higgins has resigned as chairman of the board of Hercules Powder Company, a post he has held since 1944. He also resigned as a member of the company's finance committee, but remains a member of the Hercules' board of directors.

Anson B. Nixon, a vice-president since 1940, was elected by members of the board at a regular monthly meeting to succeed Mr. Higgins as chairman of the board. He resigned as a company vice-president to accept the post.

At the same time, Albert E. Forster, president of Hercules, was elected a member of the company's finance committee, to fill the vacancy left by Mr. Higgins' resignation.

Mr. Forster was elected president of the company at a board meeting April 29, when Mr. Higgins resigned the post he had held since 1939 in keeping with the Hercules' retirement policy.

Mr. Nixon, who has served as vice chairman of the board of directors since last year, is a native of Medora, Indiana. He has served as general manager of both the Hercules' Cellulose Products Department and the Naval Stores Department, two of the company's six operating departments. He became a member of the board of directors in 1932.

Mr. Nixon joined Hercules in 1915 as a chemist.



LLOYD L. STITT



STEPHEN S. EASTER

ACFA Names R. H. Acock

Robert H. Acock, principal owner and general manager of Acock Laboratories, Ltd., Austin, Texas, is



ROBERT H. ACOCK

the newly elected president of the Agricultural Chemical Formulators Association, which was organized in February for the purpose of developing better understanding of the mutual problems of insecticide formulators, farmers, and suppliers. The association encompasses a six-state area, including New Mexico, Texas, Oklahoma, Louisiana, Arkansas, and Mississippi.

The newly-elected president is one of the earliest formulators of organic cotton insecticides in the U. S. Having been born and reared on a Texas farm, which he still operates, he possesses an intimate knowledge of farm conditions.

Mr. Acock has long been active in both the industry and in civic agricultural work. He is a past vice-chairman of the agricultural committee of the U. S. Junior Chamber of Commerce as well as past chairman of the agricultural committee of the Texas Junior Chamber of Commerce. Under his leadership in these positions, an experimental farm project was carried on which attracted nationwide attention, and under his present leadership the ACFA is currently sponsoring various agricultural projects in the south and southwest.

Mr. Acock's other interests include Acock Laboratories, an analytical laboratory which he established in

Austin in 1930 and which he still heads; the International Chemicals, Inc., of Houston—a sulphur grinding company of which he is president; and Acock Laboratories Flying Service, Inc., of which he is president.

Canadian Entomologists Meet

The annual meetings of the Entomological Society of British Columbia and the Entomological Society of Canada have been announced by R. H. Wigmore, secretary of the E.S.C., Ottawa. The meetings will be held at the Empress Hotel, Victoria, B. C., October 19-21, he says. Meeting plans have not yet been announced in detail.

Conn. Field Day Aug. 19

The Connecticut Agricultural Experiment Station's annual field day will be held August 19, the Station has announced. The event is to be held at the Experimental Farm, Mt. Carmel, Conn., according to Dr. James G. Horsfall, director.

\$7 Million Ammonia Plant for Midwest

A NEW \$7 million plant for the production of synthetic ammonia and fertilizer nitrogen compounds will be built at Tuscola, Illinois, by National Distillers Products Corporation, according to John E. Bierwirth, president of National Distillers.

The production capacity of the plant will be 50,000 tons per year of anhydrous ammonia. The project will include facilities for the conversion of part of the ammonia into nitric acid which will be transformed into ammonium nitrate by reaction with more ammonia. In turn, the ammonium nitrate will be used in the manufacture of nitrogen solutions for direct application to the soil.

The nitrogen will be obtained by liquefying air to separate out the oxygen; by-product oxygen production from this plant will amount to 75 tons per day. At most ammonia plants, hydrogen is obtained by decomposition of natural gas for which

Theme of the day's activities will be soils research. Dr. Firman E. Bear, head of the Soils Department, Rutgers University, New Brunswick, N. J., will speak, and visitors will be shown field plots, exhibits and special demonstrations set up for the occasion. Control of soil pests, soil chemistry, and reports on tests with soil conditioners will be shown on the program.

Grace Names Chief Engineer

Loren C. Skinner has been named chief engineer of Grace Chemical Company's nineteen-million-dollar nitrogen plant now under construction near Memphis, Tenn. Mr. Skinner was formerly chief of the Engineering and Design Department of the United States Bureau of Mine's Synthetic Fuels Demonstration Plant at Louisiana, Missouri.

As chief engineer at Grace Chemical's Memphis plant Mr. Skinner will be responsible for all phases of maintenance and for future plant design and construction.

a variety of processes may be used. The National Distillers' plant, however, will obtain its hydrogen ready-made as a by-product of National Petro-Chemicals Corporation's huge ethylene plant now under construction at Tuscola. Studies by National's technical staff have shown that the use of this by-product hydrogen is more economical than natural gas for the production of ammonia from the standpoint of both capital cost and production cost.

Ample storage facilities for anhydrous ammonia and for the nitrogen solutions is being provided to take care of seasonal fluctuations in the demand for these products. Production is expected to begin in January, 1955, in ample time for seasonal demand for fertilizer nitrogen.

In the opinion of the National Distillers' management, Tuscola, Illinois, is an ideal location for a synthetic ammonia plant which will be the first one of its kind in that state.

AGRICULTURAL CHEMICALS

Hart Awarded Hon. Degree

Ernest Hart, executive vice-president, Chemical Division, Food Machinery & Chemical Corporation, New York, received the honorary degree of Doctor of Agriculture at the 1953 commencement exercises of Michigan State College, East Lansing, Mich., in June. Mr. Hart was one of three persons to receive honorary degrees at the 1953 commencement, but is one of only 19 persons to receive the honorary degree in agriculture in the school's 95-year history.

In conferring the degree President J. A. Hannah commended Mr. Hart for his life-long work in "translating the findings of fundamental and applied research in biology and chemistry into effective programs of action (which) facilitated important advances in horticultural practice . . . and helped to develop an important new segment of American industry."

Mr. Hart is an alumnus of Michigan State (1914) and has devoted his entire business life to the development and application of insecticides, fungicides and herbicides.

Albert W. Raymond Dies

Albert W. Raymond, European manager of Combustion Engineering, Inc., died June 18, in New York. A native of Evanston, Illinois, Mr. Raymond attended Columbia University and later joined Raymond Bros. Impact Pulverizer Company of Chicago—a firm founded by his father and uncle in 1887. After serving with the U. S. Forces in World War I, he was made manager of that company's French affiliate—Raymond Freres of Paris, renamed Societe Anonyme des Foyers Automatiques of France after Raymond Bros. had become a part of Combustion Engineering.

Cyanamid Completes Unit

First completed unit of American Cyanamid Company's Fortier Plant under construction in Jefferson Parish, Louisiana, is now producing sulfuric acid. The unit went "on stream" early in June, according to G. J. Forney, plant manager. Next to be completed, he said, will be the

100-ton-a-day ammonium sulfate facilities.

The plant, expected to be completed early next year, will produce from natural gas such nitrogen chemicals as ammonia, acetylene, hydrocyanic acid, and derivatives of these, including acrylonitrile and ammonium sulfate.

The entire plant, Mr. Forney said, will embody numerous manufacturing processes unique in the chemical industry. It was designed and is being built by Chemical Construction Corporation, a Cyanamid unit.

Monsanto Div. Names Lum

James H. Lum has been appointed director of development for Monsanto Chemical Company's Organic Chemicals Division, according to John L. Gillis, company vice-president and division general manager.

Mr. Lum, was formerly development manager of Monsanto's Phosphate Division, and succeeds Alfred T. Loeffler, director of development since January, 1951, who has accepted an executive position with the Chemicals Division of Food Machinery and Chemicals Corporation.

A native of Whiting, Ind., Mr. Lum has been with Monsanto since 1936 when the company acquired the Thomas & Hochwalt Laboratories at Dayton, Ohio, and formed its Central Research Department.

Calspray Moves Wierenga

The transfer of M. E. Wierenga to Maumee, Ohio, as district manager for the California Spray-Chemical Corp., has been announced by company officials. Mr. Wierenga will supervise sales and distribution of "Ortho" products in Indiana, Kentucky, Ohio and all of Michigan except the 15 northernmost counties. He will also supervise operation of three of the company's dust mills, located at Fennville, Michigan, Evansville, Indiana and Maumee.

Mr. Wierenga was raised in the mid-west and started with Calspray in 1947, after serving three years with the navy and receiving his discharge as a Lieutenant Commander.

Colby to Texas for Dow



DR. ROBERT W. COLBY

Dr. Robert W. Colby, animal nutritionist of the Agricultural Chemical Research Laboratory at The Dow Chemical Company's Midland, Michigan plant, has been appointed director of agricultural research for Dow's Texas division, Freeport.

Dr. A. P. Beutel, Dow vice-president and Texas division general manager, announces that Dr. Colby will be in charge of developmental work in animal and poultry nutrition and disease control as well as herbicides at the expanded facilities of the company's Agricultural Research Department at Lake Jackson, Texas. He will also continue development activities now under way in cooperation with college agricultural departments and experiment stations.

Dr. Colby joined the Midland Laboratory in 1951.

J. Wilson McBride Dies

The sudden death on June 20, of J. Wilson McBride, has been announced by Chamberlin & Barclay, Inc., Cranbury, N. J., with whom he had been associated for the past 29 years. The firm manufactures fertilizer materials.

Chas. Ward Rejoins Fulton

CHARLES P. WARD, JR., veteran of World War II and later recalled for active duty with the Louisiana Air National Guard in 1951, has returned to his post with Fulton Bag & Cotton Mills. The company has transferred him to its Dallas, Texas, plant. He was formerly located at New Orleans for the company. Mr. Ward's war record earned him the Air Medal with Oak Leaf Cluster and five battle stars in recognition of his completion of twenty-three missions over Germany with the Eighth Air Force.



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Bishopp Leaves USDA; Knipling Succeeds



DR. BISHOPP



DR. KNIPLING

Dr. F. C. Bishopp has left the U. S. Department of Agriculture to join the Oscar Johnson Cotton Foundation in Pink Bollworm control work. He has long been identified with the Bureau of Entomology and Plant Quarantine, of which he was assistant chief.

Appointed to succeed him is Dr. E. F. Knipling, an entomologist of note in his own right. He was president of the American Association of Economic Entomologists last year. Further details are found in the "Washington Report," page 65, this issue.

McKenna Leaves Maine Post

Having completed his construction contract with Hinman Associates, Portland, Maine in the erecting and putting into operation of a new insecticide manufacturing plant at Westbrook, Maine, Joseph P. McKenna has left the firm, he has announced. Mr. McKenna was responsible for overseeing construction details, the purchase and installation of equipment and for getting the new plant in shape to produce various insecticides. (See Agricultural Chemicals article, May, 1953, pages 56 and 57).

Mr. McKenna had not announced his plans for the future at press time, but indicated he expected to continue his association with the agricultural chemical industry.

New Western Fertilizer Plant

Carstens Packing Company, Tacoma, Washington, is constructing a new \$175,000 fertilizer plant in Tacoma. According to Tom Carstens, president, plant capacity will be between 20,000 and 25,000 tons annually. Operations are scheduled to begin about the first of the year. The product will carry the brand name of "Nu-Life" fertilizers.

Latest equipment for handling

bulk materials is being installed, it is reported. Greater demand for fertilizer materials in the area prompted the expansion program, Mr. Carstens states. With the new plant in operation, the company expects to enlarge its distribution in the Northwest.

Canadian Plant Is Planned

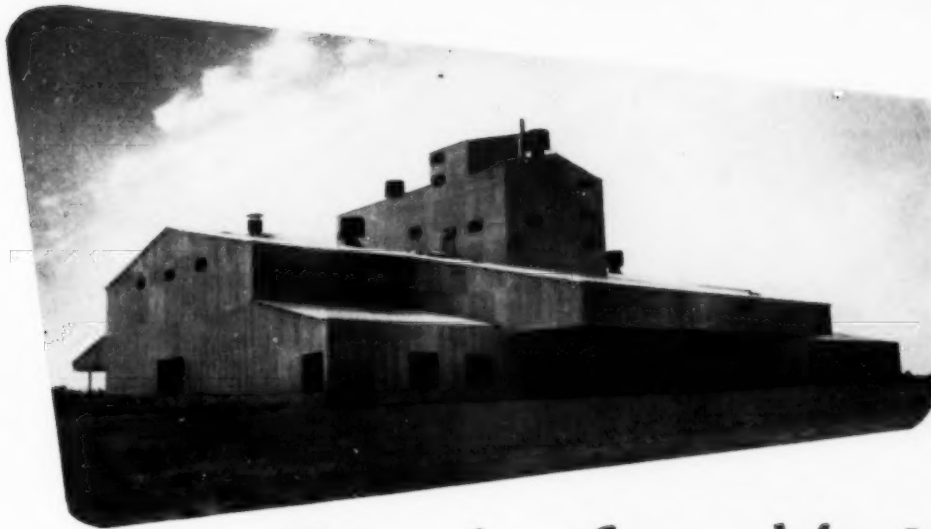
Plans for construction of a new ammonia plant at East Montreal, Canada, are being considered by Dominion Tar & Chemical Co., it is reported. The proposed plant would turn out about 150 tons of ammonia daily for distribution in eastern Canada.

Radovich to New APC Post

Frank Radovich has been appointed to the newly-created sales development department of American Potash & Chemical Corp., Los Angeles, the company has announced. Mr. Radovich, who became an assistant to Alfred M. Esberg, vice-president, is a graduate of California Institute of Technology and has long been associated with the chemical industry.

The new department currently is carrying out evaluation work in connection with the new Trona Organo-Boron compounds and with other chemicals being developed.

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 MANURE SALTS 20% K_2O MIN.

These fluffy cotton bolls might very well end up as pretty summer frocks—or canvas sacks—but to the men that raised it, a bumper crop of cotton means a profit for the time and labor that was invested.

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"Grub" Leonard, Former NAC Head, Retires

GEORGE F. ("Grub") Leonard, executive vice-president of Tobacco By-Products and Chemical Corp., Richmond, Va., has announced his retirement which became effective July 1.

Mr. Leonard, long identified with the insecticide industry and prominent in activities of the National Agricultural Chemicals Association, has been connected with Tobacco By-Products & Chemical Corp. for the past 38 years.

"Grub" states that his plans for the future are a little indefinite, but he plans to spend a considerable amount of time around his orange trees in Florida, leaving some days free for fishing. He expects also to maintain many of his contacts in the industry and plans to attend the September meeting of the N. A. C. Association at Spring Lake.

His contributions to the pesticide industry have been both important and of long duration. He was one of the original organizers of the old Agricultural Insecticide & Fungicide Association which four years ago became the NAC. From 1946 to 1949 he was NAC Assn. president and in addition, has served on numerous committees and is a constant booster for the industry.

During World War II he was chairman of the Industry Committee of the Office of Price Administration, Washington, D. C., and served as a member of the industry over-all committee later. At present, he is chairman of the NAC finance committee. His principal interest through the years, he says, has been toward smooth-working relationships between the pesticide industry and government.

"Grub" is a native of the State of Michigan and a graduate of Michigan State College, East Lansing. He taught school for two years in Michigan, then joined the sales department of Tobacco By-Products Corp. in Louisville, Ky. He was made sales manager and later became executive

vice-president, the position he held at retirement.

While residing in Louisville,



GEORGE F. ("Grub") LEONARD

Mr. Leonard was active in business, being president of the Louisville Building and Loan Association for a ten-year period. He holds membership in the Entomological Society of America and is a veteran of World War I.

Eston Appoints Two

Appointment of two new field representatives has been made by Eston Chemicals Division of American Potash & Chemical Corporation. The division produces refrigerants, agricultural chemicals, insecticides, fumigants and commercial chemicals.

Truman E. Laningham, former entomologist at the Shell Agricultural Laboratory, Modesto, Calif., will be in Eston's basic chemical department in Northern California, with headquarters at Modesto. He is a graduate of the University of California. Jack Triche, has been put in charge of the refrigerants distribution branch at St. Louis, Mo.

Turks Want U. S. Chemicals

The Ministry of Public Health and Social Assistance of the Turkish Republic has announced that it will purchase with "free dollars" from the U. S. a number of agricultural chemi-

cals. Bids must be in Ankara on or before August 11, it states.

To be purchased are: 440,924 lbs. pure technical DDT; 1,322,773 lbs. 75% water wettable DDT powder concentrates; 18,930 lbs. "Triton X-100"; 18,930 lbs. "Triton B-1956"; 145,750 gallons (551,663 lbs.) "Xylene"; and spare parts for Hudson sprayers.

Prime manufacturers may obtain full sets of specifications by writing or telephoning the Turkish Economic Mission, 1700 Webster St., N. W., Washington 11, D. C. (The telephone number is RA 6-2510) A certificate of the local Chamber of Commerce will be required certifying that the bidder is a prime manufacturer as a prerequisite to bid.

Marvin Heads Mich. Chemical

Theodore Marvin has been elected president of Michigan Chemical Corporation, Saint Louis, Mich., the company has announced. Mr. Marvin, long associated with Hercules Powder Co., Wilmington, Del., succeeds Donald D. MacFarlane, M.C.C. board chairman who has been acting president since the resignation of R. P. Place several months ago.

The new president was with Hercules for thirty years and was its director of advertising since 1944. He holds degrees from the Colorado School of Mines and was employed by several mining companies following World War I.

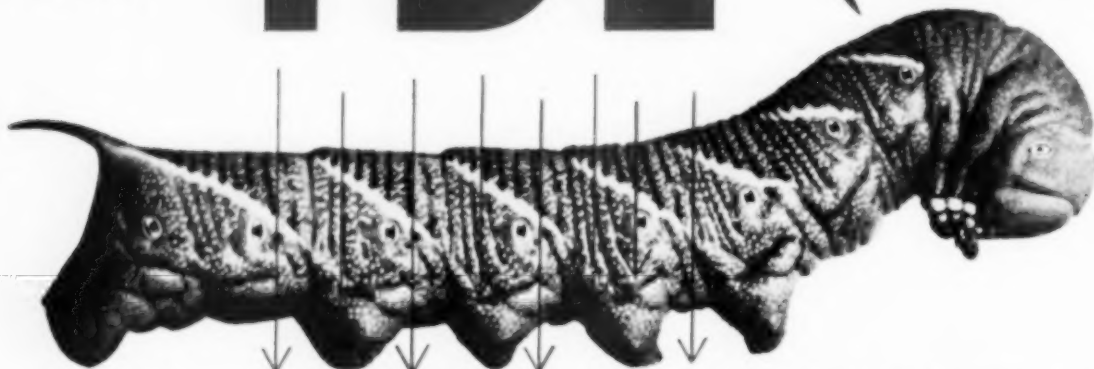
His first work with Hercules was on the editorial staff of a company magazine and he worked up from that point through the positions of assistant advertising manager, advertising manager and in 1944, director of advertising.

New Fertilizer Combination

Oswego Soy Products Corp., Oswego, N. Y., has introduced a new plant food and soil conditioner combination under the name of "Feralon" for application on indoor plants, gardens and shrubs. Based on soy protein supplemented with additional phosphates and potash, the product is said to be one of the first mixed fertilizers to contain fritted trace elements (F.T.E.) as well as antibiotics.

The new product is packaged in a modern, translucent, flexible squeeze injector bottle, the powder is injected through the slender applicator tip into holes poked into soil in the flower pots.

For TDE (DDD)



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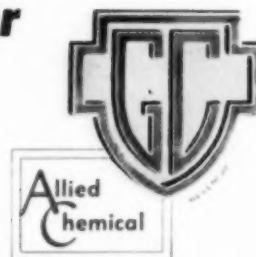


Full-scale commercial production of TDE (DDD) at General Chemical's Marcus Hook, Pa. plant provides formulators and dust mixers with a reliable source of supply for this increasingly important organic chemical.

Now you can obtain your TDE technical and dust base requirements from the same producer which has long been a major supplier of DDT, Arsenicals,

BHC, Lindane, Potassium Cyanate, organic miticides and other base materials for agricultural insecticides, fungicides and herbicides.

For your TDE needs—or for any of the other toxicants listed below—write or phone any of General Chemical's offices located from coast to coast.



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DDT

Technical, Flake or Granular
Dust Base, 50% & 75%

BHC

Technical (15%, 34% & 90%
Gamma)
Dust Base, 12% Gamma

LINDANE

Technical
Dust Base, 25%, 75%, 95%

Emulsifiable Concentrate, 20%
Oil Concentrate, 20%

ORGANIC MITICIDES

Genite+ 883 (p-chlorophenyl
p-chlorobenzene sulfonate)
Technical

Genite 923 (2,4-Dichlorophenyl
Ester Benzene Sulfonic Acid)
Technical

"Aramite" Technical

LEAD ARSENATE

Standard
Astringent
Basic

CALCIUM ARSENATE

Standard
Low Lime

PARATHION

Dust Base, Emulsifiable
2 & 4 lbs. per gallon

FERBAM

Dust Base (76% Ferric Dimethyl-
Dithiocarbamate)

ZIRAM

Dust Base (76% Zinc Dimethyl-
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Acid, and Technical Esters

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Acid, and Technical Esters

TCA Sodium Salt

90% Dry Powder
50% Liquid Concentrate

Potassium Cyanate

Technical
Cotton Defoliant
Weed Killer *Reg. U. S. Pat. Off.

Phytopath's September Meeting Plans Made

PLANs are practically complete for the September 7-10 meeting of the American Phytopathological Society scheduled to be held at the University of Wisconsin, Madison, in conjunction with the American Institute of Biological Sciences.

Dr. S. E. A. McCallan, Boyce Thompson Institute for Plant Research, Yonkers, N. Y., secretary of the APS, has stated that the annual Fungicide Colloquium will be held Monday evening, September 7 and that representatives of the industry will be given an opportunity to present information on new products to be available for next year's growing season or for experimental purposes.

An important session on fungicides will be held during the meeting. Gordon S. Taylor, Connecticut Agri. Station, will discuss "Control of Tobacco Blue Mold by Root Application of Zineb and Ferbam"; J. D. Wilson and J. B. Miller, Ohio Station, "Polyelectrolytes as Soil Conditioners"; and Curt Leben, U. of Wisconsin, "Acidic Buffer Sprays and the Control of Early Blight on Tomato Leaves."

Four authors, A. G. Newhall, W. A. Rawlins, J. L. Brann, Jr. and W. W. Gunkel have prepared a paper, "Liquid Concentrates versus Dusts for In-the-Row Treatments Against Seedling Diseases and Insect Pests, with Special Reference to Onion Smut and Maggot," which will be presented at the meeting. Another paper, by James G. Horsfall and Saul Rich, Connecticut Station, New Haven, will be presented. It is entitled, "Relation of Polyphenol Oxidases to Fungitoxicity."

H. L. Keil, H. P. Froehlich and Frank B. Maughan, Rohm & Haas Co., Philadelphia will present a paper, "Efficacy of Certain Organic Compounds in Control of Bean Powdery Mildew under Laboratory Conditions," and another paper, "Comparisons of Fungicides for the Control of Strawberry Leaf Blight"

is to be presented by Robert H. Fulton and Donald Cation, Michigan State College.

Other sections of interest to the trade will include symposia on virus diseases of tobacco and other plants; cereal diseases, diseases of vegetable crops and of forage crops, and diseases of ornamentals and turf.

The meeting will terminate at noon Thursday, Sept. 10, following a session on plant diseases and a business meeting.

New Plant For Goodrich

Plans to build a new \$8,500,000 chemical plant at Calvert City, Kentucky, have been disclosed by John R. Hoover, president of B. F. Goodrich Chemical Company. The plant will manufacture acrylonitrile, used in making soil conditioners and an increasing number of other chemical products.

The announcement follows closely the company's formal opening of a \$6,000,000 vinyl chloride monomer plant also at Calvert City. This new plant will broaden the base of the company's chemical operations, a spokesman pointed out.

Ground was to be broken soon for the acrylonitrile plant on a tract already owned by B. F. Goodrich Chemical Company adjacent to its vinyl chloride unit. Start-up of the new plant is scheduled for the fall of 1954, with an annual capacity of 24 million pounds. Acetylene, a principal raw material for the new operation, will be fed by pipeline from the nearby plant of Air Reduction Company.

Vermiculite Co. Sold

Transvaal Ore Company, Ltd. Johannesburg, South Africa, has taken over all of the stock in Vermiculite (Pty.) Ltd. and has purchased the mines, claims and physical assets of Palabora Phosphate and Vermiculite Company, Ltd. Both acquisitions effective as of June 30, 1953.

This combines all of the vermiculite activities at Loole Kop, Palabora District, Northern Transvaal, into one centralized operation. J. von Bulow, managing director of Transvaal Ore Company, Ltd., stated that this purchase brings to realization the dream of the late Dr. Hans Merensky, founder, for a unified production and standardization of grades for South African vermiculite ore which was impossible under separate managements.

Transvaal Ore Company, Ltd. is represented solely in the United States and Canada by American Vermiculite Corporation, 654 Madison Avenue, New York, whose President William S. Steele recently returned from a London conference with Mr. von Bulow.

Fodor to NPA Staff Post

New chief of the Inorganic and Agricultural Chemical Branch, Chemical Div., NPA, is Paul A. Fodor, Jr. He is on leave from Columbia-Southern Chemical Corp., Philadelphia. C. T. Robertson will handle Mr. Fodor's work during his absence.

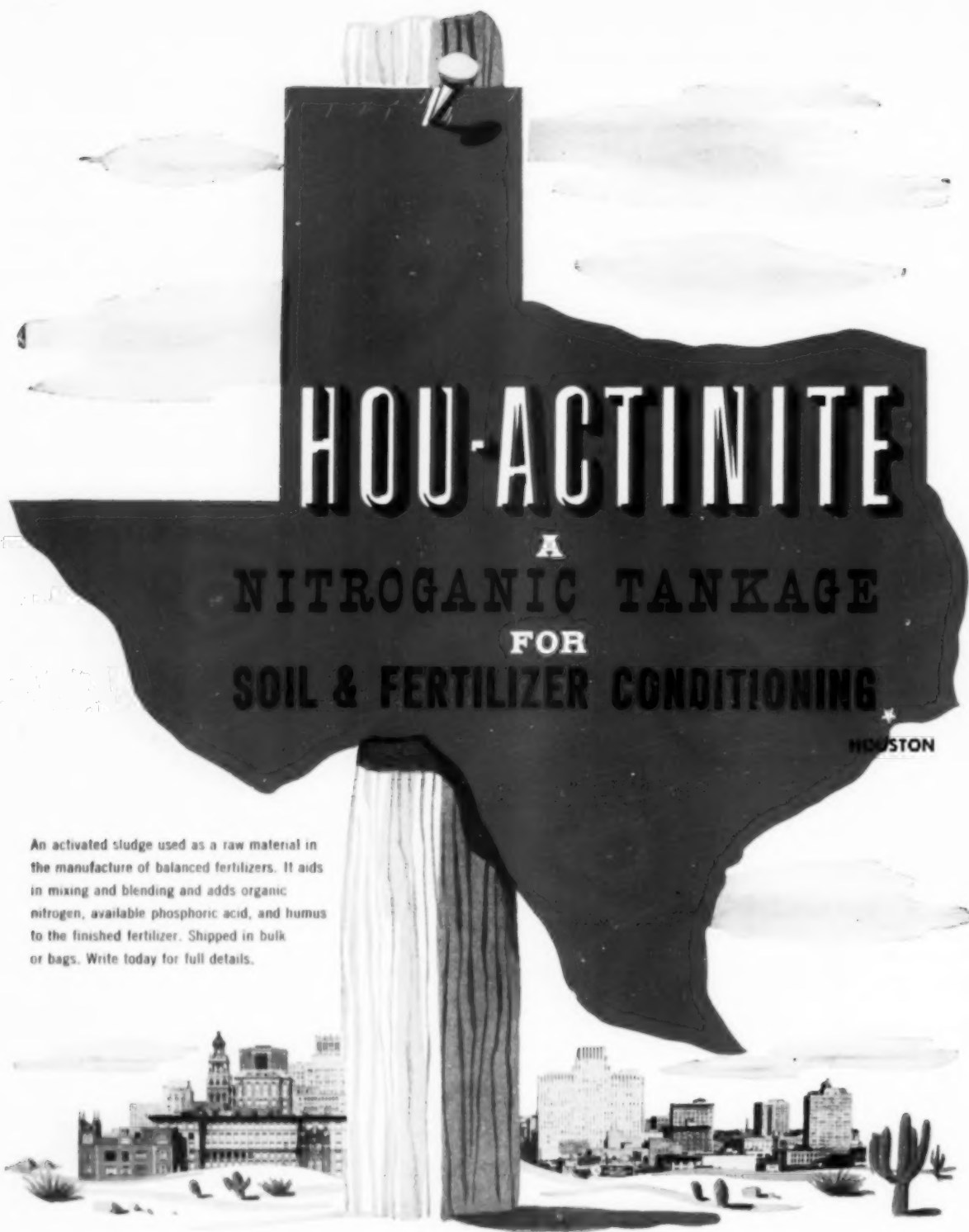
Appoints Sales Agents

Wright H. Huntley, president of Huntley Industrial Minerals, Inc., of Bishop, California, has announced the appointment of Wharton Jackson Co., with offices at 99 Hudson Street, New York 13, and headquarters in the Petroleum Building, 714 West Olympic Boulevard, Los Angeles 15, California, as exclusive sales agents.

The new agency will handle the wide range of non-metallic minerals, including talc, pyrophyllite, mica, asbestos, clays and special aluminum and magnesium silicate pigments produced from mines and plants of Huntley Industrial Minerals, Inc. located in California, Nevada and Arizona.

Wharton Jackson, head of the sales organization, has been active in the non-metallics field, having been long associated in managerial capacities with Georgia Kaolin Co.

Offices will be maintained in both New York and Los Angeles.



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LISTENING *Post*

Armyworms March in Wide Area of U. S.

This column, reviewing current insect control programs, is a regular feature of **AGRICULTURAL CHEMICALS**. Mr. Dorward is connected with the Division of Insect Detection and Identification, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.

By Kelvin Dorward



ARMYWORM outbreaks which in late May and early June caused more damage in many states than for several years, were on the decline by the middle of the month. In Tennessee, over 500,000 acres were seriously infested and between 40 and 50 airplanes, in addition to ground equipment, were used in control of the outbreak. Kentucky experienced its worst outbreak since 1931. Armyworms in Maryland were the worst since 1950 with damage to new pasture crops in grains often very severe.

Outbreaks occurred in 22 southwest and south-central Pennsylvania counties with those in the southwest receiving the heaviest attack. Severe damage was prevented by control measures but many hay fields as well as a few barley fields were destroyed. By mid-June, all of Ohio, except the extreme northern part of the State, had experienced the outbreak. The same situation applied to Indiana where the outbreak was reported as the worst for many years. In Illinois, cutworms were intermingled with the armyworm build-up. Missouri also experienced the outbreak, but it had eased to such a point that by mid-June control measures had been discontinued.

In Illinois during early June, the English grain aphid built up to

outbreak proportions and seriously threatened the wheat crop of that State. By the middle of the month, the threat had considerably lessened due to prompt control measures and a declining insect population. Missouri also experienced spotted heavy infestations of this aphid. It was also reported from Kansas as being plentiful but non-economic.

Cutworms during June were also a problem in many states. In some instances in Ohio, they were almost as serious as the armyworm with which they were quite often mixed. Stands of corn were destroyed in Illinois with some fields being replanted for the third time. Corn stands were also destroyed in Missouri where it would be necessary to replant several thousand acres. Saginaw and Grand Haven, Michigan areas also experienced trouble. Damage to river bottom crops was reported from Iowa. Other States reporting cutworm damage to cereal and forage crops in early June were North and South Dakota, Minnesota, and Kansas.

Corn Earworm Threat Serious

By the middle of June the corn earworm was becoming a problem in several states. Severe infestations were in early sweet corn in the Norfolk, Virginia area, while in Tennessee infestations were in corn over

most of the State with 90 percent infestation in some fields. Sweet corn in Monroe County, Mississippi and in South Carolina was heavily infested. In the East St. Louis, Illinois area half-grown larvae were in 75 percent of the whorls and tassels of some early fields.

Of particular interest was the rather general outbreak of a leaf miner on rice in the central valleys of California. The outbreak seemed closely associated with weather conditions adverse to rice and favorable to the leaf miner. Previous outbreaks occurred in 1922 and 1949 when weather conditions were similar to this season. By early June, approximately 80,000 acres of rice in localized areas had been treated.

Fruit Insects

WEATHER during late May delayed the hatch of codling moth eggs in several mid-western states. Development of the insect was also slow in the Yakima Valley of Washington due to weather conditions. By early June, however, entries into fruit were readily found in the Kearneysville, W. Virginia area; the Vincennes, Indiana area, in Missouri and in Illinois.

The plum curculio was more abundant in the western part of New York than in 1952. In Pennsylvania the insect was generally abundant, being heavier than last year in many areas. Late peaches in Georgia were expected to be subject to second generation attack. In the Wooster, Ohio area, the peak of the spring brood activity occurred during the last week of May and peak activity was expected in Massachusetts the first week of June. Peak flights of adults occurred in Mesa and Delta Counties, Colorado during the week ending May 29.

By the middle of June, spider-mites were very abundant in many Massachusetts orchards where controls were not practiced. They were also on the increase in Minnesota. The European red mite was building up in Ulster and Columbia Counties, New York and two-spotted mite was increasing in Saratoga County. In Indiana, mites had increased to a



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PASADENA, CALIF.—604 Citizens Bank Bldg. • NEW YORK, N. Y.—80 Broadway • BARTLESVILLE, OKLA.—Adams Bldg.

point where control was necessary in some orchards. Heavy infestations of both the European red mite and the two-spotted mite were reported from the Cape Girardeau and Columbia areas of Missouri.

Aphids in orchards were also on the increase in several states. The apple aphid was increasing in orchards of New Jersey, Delaware, Indiana, and Illinois. Aphids were also abundant in Massachusetts, Ohio and Idaho orchards.

Vegetable Insects

THE Colorado potato beetle is giving indications that it may be the most important potato and tomato insect of the year in New York State. In Delaware, it was generally the most troublesome pest on tomatoes and was causing damage in Maryland, Mississippi, Wisconsin, Michigan, Illinois and Washington. Pennsylvania reports the beetle as being more

numerous than in the past eight years.

Mexican bean beetle first brood larvae were causing considerable injury to snapbeans in the Norfolk Virginia area. There was an outbreak of this insect in eastern Montgomery County, Maryland and larvae were more abundant than usual in south-central Pennsylvania. By the first of June, the insect was found in the Columbia, Missouri area. Early in the month they were appearing in New York, and in Colorado adults appeared in considerable numbers on June 7-8.

During the month, flea beetles caused damage to vegetables throughout North Carolina and were generally very abundant in Massachusetts. They were active in New York and reported as being difficult to control on potatoes and tomatoes in Columbia County. Other states reporting flea beetle damage were Georgia, Montana, Wisconsin, and Utah.★★

trol. In 1952 all materials except "Sperguson" (slurry) gave significant to highly significant control of damping-off or seed decay. The effectiveness of the treatments was very similar for both years except for the "Arasan" group. Further tests should be made with these materials to determine whether differences were due to formulation or something else.

The disparity between 1951 and 1952 results is greater than is usually to be expected for "Arasan". Two mercury materials, "Ceresan M" and "Panogen", improved stands in both years and ranked well toward the top even though lima beans are generally considered mercury-sensitive. Experimental material "L-224" (mercury-zinc-chromate) was undoubtedly injurious to the seed. "Sperguson", a long-time favorite for use on lima bean seed (2,9), neither compared well with other fungicides nor was clearly superior to the control.

"Orthocide 75" seed treater and "HL 609" (a combination of "Orthocide 75" and lindane) appeared very promising in the 1952 test. The latter material, as well as an "Arasna SF" and lindane combination, has been recommended for beans in New York state. Apparently these materials are in a class with "Ceresan M" (slurry), and certainly they deserve further testing. Although "Vandicide 51" was applied at a higher rate in 1952, than in 1951, few or no increased benefits were noticed.

A noteworthy observation was made regarding "Phygon XL" as a seed protectant for lima beans. The product caused blackening of the cotyledons and prevented the seed coat from splitting so that the cotyledons were restrained abnormally. Because of this, there was usually a slight retardation in the development of the seedling. These effects are not readily noticed under field conditions, but were observed on navy pea beans in foundation bean seed fields in 1952 after "Phygon XL" (slurry) had been used as a seed protectant. Seed from the 1952 experimental treatments retained for storage tests displayed these effects when germinated in the greenhouse in sand at 60° to 65° F.

Fungicidal Seed Treatments Appraised

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller



DONALD J. deZeeuw and Axel L. Andersen of the Michigan State College and the U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering, respectively, report results of cooperative tests of different materials for lima bean seed treatment, at East Lansing, Michigan, for the preceding two years. They emphasize that, as in all such work, certain reservations should be kept in mind because of the great variation that can be obtained from year to year and place to place.

Fordhook 242 lima (Ferry-Morse Seed Co.) was selected for the tests because of its extreme sensitivity to damping-off and seed decay. Table 1 gives the percentage stands obtained for the two years arranged in order

of rank for those materials used in both trials. Carbide & Carbon Chemicals Corp. "L-224" was used only in 1951 and California Spray-Chemical Corp. "Orthocide 75" and "HL 609", only in 1952.

The damping-off potential appears to have been considerably higher in 1952 than in 1951. This, together with the low replication variance of 1952, would account for the smaller L.S.D. in the latter year and cause more materials to appear significantly beneficial. Highly significant differences were obtained in 1951 with "Arasan SF" (slurry) and "Ceresan M" (slurry), whereas "Panogen" was significantly superior only to the control. None of the other materials was statistically better than the con-

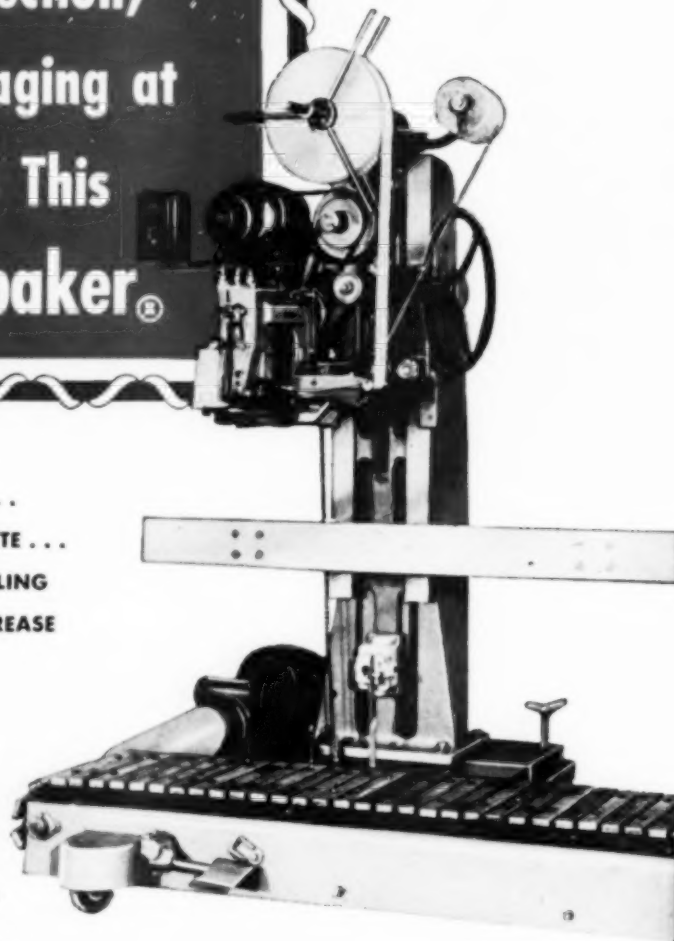
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Soybean Seeds Treated

RESULTS of several years, from 1947 to 1952 inclusive, of co-operative field tests on the value of soybean seed treatment, made at the Minnesota Agricultural Experiment Station by the Experiment Station and the U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering, are reported by M. F. Kernkamp, F. I. Froeseiser, and J. W. Gibler. Their summary includes effect of seed treatments not only on yield, but nodulation as well.

All of the treatments were planted in randomized blocks with three or four replications, except in 1949 when six replications were used. Fungicides that were known to cause injury to seedlings when used in excessive dosages were applied at recommended rates; those that would not injure seedlings were applied at excessive rates. Fungicides were usually applied several days to several weeks in advance of planting. The planting rate was adjusted to fit the experiment, but unless otherwise stated, it was 60 pounds per acre in row rows spaced 30 inches apart.

The fungicides, rates of application, rates of planting, and yield data appear in Tables 2 and 3. All yields are recorded in bushels per acre, and yields that were significantly different from the check are indicated.

It is evident from Table 2 that only the reduction in yield from "Arasan"-treated-seed in 1951 was significantly different from the check. The reason for the reduction is unknown, but it is of little importance since there were no significant differences for the means of the four years.

In the tests reported in Table 2, there was usually an increase in stand for all treatments over the check. The results indicated that the heavy rate of planting overshadowed increases in stand from treatment; consequently to demonstrate any increases in yield from seed treatment, the planting rate should be reduced. Therefore, an experiment was designed in which treated seed was planted at rates of 20, 40, and 60 pounds per acre in row rows spaced 30 inches apart. The test was planted in a randomized block design, replicated three times in 1951 and repeated in

1952. The data from these tests are recorded in Table 3.

Except for "Vancide 51" (272 cc./bu.) at the 40-pound rate in 1951, there were no significant increases in yield from seed treatment. However, the results from planting rates are interesting. The yields from different rates were not significantly different, although 20 pounds gave inferior yields in both years. There was no appreciable difference between the 40- and 60-pound rates. In Minnesota 75 or more pounds of seed per acre are recommended, but these results indicate that seeding rates could be reduced without jeopardizing yields.

While these tests were being made, data were accumulated on the influence of chemical seed treatments on nodulation by the nodule bacterium, *Phizobium leguminosarum*. Nodules were counted on the roots of representative numbers of plants picked at random from each plot. The treatments for these tests comprised fungicides alone, fungicides plus inoculum, inoculum alone, and a non-treated non-inoculated control. Data were collected on this phase of the

TABLE 1

Percent stand obtained from Fordhook 242 lima bean seed treated as indicated and rank of materials used for treatment, in trials at East Lansing, Michigan, in 1951 and 1952.

| 1951 | | | | 1952 | | | |
|----------|------------------------------------|---------------------------|----------------------------|----------|------------------------------------|---------------------------|----------------------------|
| Rank | Material and method of application | Dosage (oz./100 lb. seed) | Percent stand ^a | Rank | Material and method of application | Dosage (oz./100 lb. seed) | Percent stand ^a |
| 1 | Arasan SF (slurry) | 3 | 60.4 | 1 | Ceresan M (slurry) | 2 | 52.5 |
| 2 | Ceresan M (slurry) | 2 | 59.0 | 2 | Ceresan M (dry) | 2 | 44.0 |
| 3 | Panogen (liquid) | 2 | 57.1 | 3 | Phygon SL (slurry) | 4 | 43.3 |
| 4 | Arasan (dry) | 4 | 54.2 | 4 | Panogen (liquid) | 2 | 42.5 |
| 5 | Phygon XL (slurry) | 4 | 53.8 | 5 | Arasan SF-X (slurry) | 3 | 42.3 |
| 6 | Ceresan M (dry) | 2 | 53.3 | 6 | Vancide 51 (liquid) | 6 | 35.2 |
| 7 | Phygon XL (dry) | 4 | 50.2 | 7 | Phygon XL (dry) | 4 | 33.7 |
| 8 | Spergon (slurry) | 4 | 49.6 | 8 | Arasan (dry) | 4 | 29.8 |
| 9 | Spergon (dry) | 4 | 48.5 | 9 | Spergon (dry) | 4 | 29.6 |
| 10 | Vancide 51 (liquid) | 4 | 45.4 | 10 | Spergon (slurry) | 4 | 25.6 |
| 11 | Control | — | 44.4 | 11 | Control | — | 21.0 |
| | Carbon & Carbide L-224 (dry) | 4 | 25.6 | | Orthocide 75 (dry) | 2 | 51.9 |
| | | | | | Orthocide 75 (slurry) | 2 | 51.7 |
| | | | | | Orthocide HL 609 (dry) | 3 | 51.5 |
| L. S. D. | | | | L. S. D. | | | |
| | 5% | | 10.9 | | 5% | | 8.1 |
| | 1% | | 14.5 | | 1% | | 10.9 |

^a80 seeds per row. Stand counts 20 days from planting.
^b80 seeds per row. Stand counts 14 days from planting.

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work in the 1947, 1948, and 1951 yield trials. Two additional tests planted in 1952 are discussed separately because of special circumstances. Table 4 gives the treatments and nodulation per plant that developed in the five field tests.

In 1947 and 1948 an effort was made to plant the tests on ground that had never produced soybeans before in order to give the inoculum an opportunity to manifest itself. Apparently nodule bacteria were present in the fields used prior to inoculation and planting, because none of the treatments had any effect on the results. In 1951 the test was planted in a field that had produced soybeans in 1949 and wheat in 1950. As in 1947 and 1948, the treatments had no effect on the results.

Previous greenhouse work had shown that treating soybean seed had no effect on nodulation providing the seed was planted in soil with a sufficiently high population of *Rhizobium*, but that nodulation was reduced on plants from chemically treated seed planted in autoclaved soil. Tests were made to determine if the results would be the same in the field.

The conditions of the 1947, 1948, and 1951 tests satisfied the requirements of soils in which *Rhizobium* was present, but did not satisfy the requirements of soils with little or no *Rhizobium*. Therefore, in 1952, two fields with very light sandy loam soils were chosen, one at LeSueur and the other at the Grand Rapids Experiment Station, Grand Rapids. In the latter location, soybeans are rarely grown, and presumably the soils at those locations contained a relatively low population of *Rhizobium* and would be comparable to autoclaved soil.

Federal Chemical Ups Shelby

S. E. Shelby has been made general production manager of all of the plants of Federal Chemical Co., Louisville, Ky., the company has announced. Mr. Shelby was formerly head of the company's engineering department. He will make his headquarters at Nashville, Tenn.

TABLE 2

Yields from soybeans treated with six fungicides in 1947, 1948, 1949, 1951. Experiments in Minnesota.

| Fungicide | Rate of application oz. per bushel | Yields (bu. per acre)* | | | |
|----------------------|---------------------------------------|------------------------|------|------|-------|
| | | 1947 | 1948 | 1949 | 1951 |
| Spergon | Excessive dosage | 32.2 | 25.2 | 18.8 | 20.1 |
| Semesan Jr. | 2 | 30.4 | 23.4 | 21.2 | — |
| New Improved Ceresan | 1/2 | 34.0 | 23.8 | 19.1 | — |
| Ceresan M | 1 | — | — | 19.3 | — |
| Red Cuprocid | 2 | — | — | 20.3 | — |
| Arasan | Excessive dosage | — | — | 20.4 | 18.8* |
| Control | | 34.0 | 23.1 | 17.7 | 21.4 |

*Averages of 4 replications in 1947, 1948, and 1951, and averages of 6 replications in 1949.
*Significant at the 5% level.

TABLE 3

Yield of soybeans from treated seed planted at 20, 40, and 60 pounds per acre in 1951 and 1952. Experiments in Minnesota.

| Fungicides and rate of application per bushel | Yield in bushels per acre from indicated rate of planting in pounds per acre | | | | | |
|--|---|---------|---------|---------|---------|---------|
| | 1951 | | | 1952 | | |
| | 20 lbs. | 40 lbs. | 60 lbs. | 20 lbs. | 40 lbs. | 60 lbs. |
| Arasan SF 2 oz. | 15.6 | 19.4 | 20.6 | 28.1 | 33.9 | 31.4 |
| Arasan SF 5 oz. | 18.2 | 19.6 | 21.5 | 27.8 | 32.7 | 32.6 |
| Vancide 51 136 cc. | 17.0 | 19.1 | 19.9 | 25.3 | 32.3 | 30.1 |
| Vancide 51 272 cc. | 17.7 | 21.8* | 22.3 | 27.3 | 30.3 | 31.9 |
| Spergon 2 oz. | 17.8 | 21.0 | 21.3 | 29.2 | 31.4 | 31.9 |
| Spergon 5 oz. | 19.1 | 21.6 | 21.4 | 26.4 | 32.9 | 32.0 |
| Control | 17.9 | 17.8 | 21.1 | 30.3 | 29.5 | 30.9 |
| Means | 17.6 | 20.1 | 21.1 | 27.8 | 31.8 | 31.5 |

*Significant at the 5% level.

TABLE 4

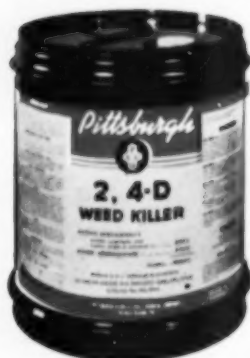
Average number of nodules on individual soybean plants grown from seed treated with various fungicides or inoculated with *Rhizobium leguminosarum* in five field tests in Minnesota.

| Treatment | Average number of nodules per plant | | | | |
|--|-------------------------------------|------|------|---------|--------------|
| | 1947 | 1948 | 1951 | 1952 | |
| | | | | LeSueur | Grand Rapids |
| Spergon | 1.8 | 3.0 | 5.1 | 0.3 | 0 |
| Spergon + <i>Phizobium</i> | 1.7 | 2.1 | 5.1 | 2.4 | 0 |
| New Improved Ceresan | 1.9 | 2.9 | — | — | — |
| New Improved Ceresan + <i>Rhizobium</i> | 1.8 | 3.5 | — | — | — |
| Semesan Jr. | 1.7 | 2.2 | — | — | — |
| Semesan Jr. + <i>Rhizobium</i> | 1.8 | 4.1 | — | — | — |
| Arasan | — | — | 5.5 | 0.3 | 0 |
| Arasan + <i>Rhizobium</i> | — | — | 5.7 | 3.5 | 2.5 |
| <i>Rhizobium</i> | 1.8 | 4.0 | 5.0 | 4.8 | 2.6 |
| Control | 1.7 | 4.7 | 5.7 | 0.1 | 0 |

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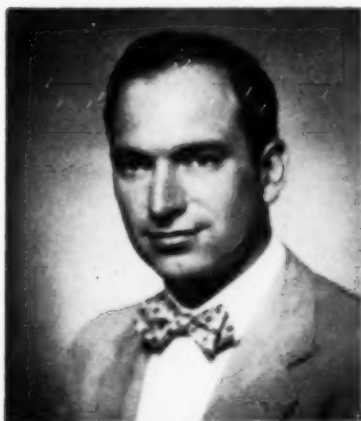
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PHILIP P. MUELLER

Philip P. Mueller has joined Ethyl Corporation to be in charge of international trade in agricultural chemicals. He was formerly export sales manager for John Powell & Co., Inc.

Mr. Mueller was born in Meriden, Conn., and attended the University of Connecticut, where he received a BS degree in entomology, in 1942. For the next four years he was overseas in the Army and joined Powell following his discharge as a first lieutenant.

Mr. Mueller is a member of the foreign trade committee of the National Agricultural Chemical Association, and is a member of the Export Managers Club of New York and the Entomological Society of America.

MCA Elects Foster President

William C. Foster was named the first full-time president of the Manufacturing Chemists Association at the group's recent meeting at White Sulphur Springs, W. Va. The new head, formerly Deputy Secretary of Defense, will direct the association's activities from Washington, D. C.

Charles S. Munson, former president of the MCA, was elected board chairman at the meeting.

Opens Kansas City Office

San Francisco Chemical Co. has announced the opening of a sales division office at 3542 Main Street, Kansas City, Mo. The new office will handle all of the firm's business pertaining to phosphate rock for direct application use.

San Francisco Chemical Co. is a pioneer miner of phosphate rock in the Inter-Mountain West, having started operations in southeastern Idaho in 1908. The company is op-

rating mines presently in southeastern Idaho, western Wyoming and northeastern Utah. The mining and marketing of raw phosphate rock is the sole business of the firm, according to Virgil Givens, sales manager, Montpelier, Idaho.

Offers Silage Preservative

Riverdale Chemical Co., Harvey, Illinois, is marketing a grass silage preservative, "Pasture Fresh", said to reduce nutrient losses from the silo,

improve composition for food value, improve color and odor and give more complete digestibility. The material is to be used at the rate of 8 pounds per ton of fresh cut grass. Complete details are available from the company, Riverdale, Illinois.

Pest Operators to Rutgers

Pest control operators from New Jersey and nearby states will meet at Rutgers U., New Brunswick, August 17.

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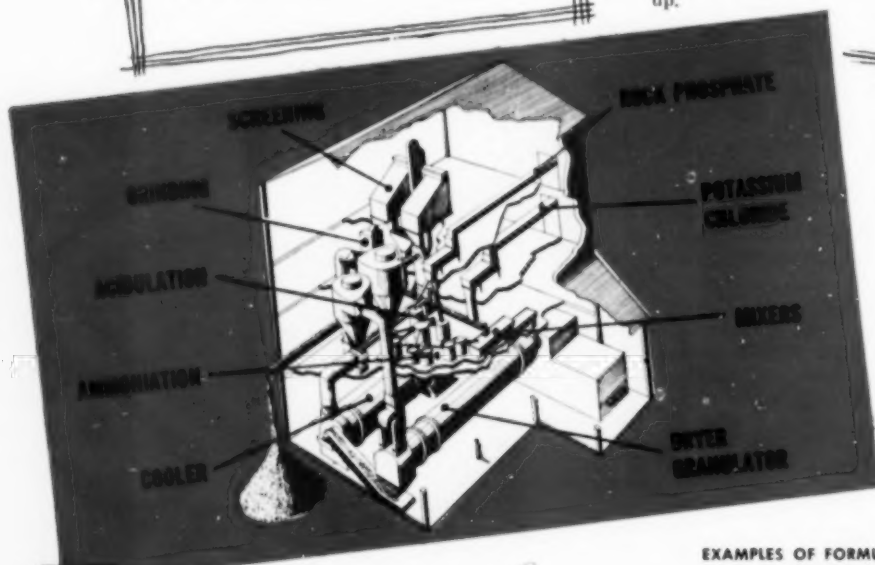
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| 11 | 11 | 11 | " " " |
| 10 | 15 | 20 | (phospho-nitric acidulation) |
| 12 | 15 | 18 | " " " |
| 12 | 12 | 20 | " " " |
| 14 | 14 | 14 | " " " |
| 10 | 20 | 20 | " " " |

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AGRICULTURAL CHEMICALS

News *BREVITIES*

A NEW FIRM, WILSON & GEO. MEYER & CO. Intermountain, has been formed with offices in Salt Lake City, Utah, it has been announced. The new setup will distribute phosphatic fertilizer products of the new five million dollar plant now under construction by Western Phosphates, Inc., at Garfield, Utah. Head of the new company will be Wilson Meyer, president of Wilson & Geo. Meyer & Co., San Francisco.

ROBERT P. GOODALE has been named advertising manager of Rohm & Haas Co., Philadelphia. He succeeds Colin C. Campbell, who has been placed in charge of the company's public relations department. Mr. Goodale has been with Rohm & Haas since 1948. Before then, he was with Resinous Products & Chemical Co., Philadelphia, which was an associate firm, before its merger with R & H that year.

BEMIS BRO. BAG CO. is host this summer to associate professors from two colleges, as a part of the 1953 College-Business Program, designed to provide educators an opportunity to observe modern business in action. The visiting professors are Melvin L. Greenhut, Mississippi State College, and Thomas M. Lowry, Jr., Southwestern College, Memphis, Tenn. They will spend six weeks at the company's general offices in St. Louis.

A DROP OF TEN PER CENT in production of pesticides and other organic agricultural chemicals in 1952 has been reported by the U. S. Tariff Commission. It says that production of this type of product in 1952 was 418 million pounds compared to 465 million pounds the previous year. Sales in 1952 were reported to be \$133 million compared with \$150 million in 1951.

Production in 1952 of cyclic pesticides and other cyclic organic

agricultural chemicals amounted to 372 million pounds compared with 407 million pounds in 1951, it was reported. This made a decrease of 9 per cent.

WHITE PINE WEEVIL in New Hampshire forests is responsible for a reduction of potential lumber supply by some 2 million board feet, U.S.D. A. entomologists have found following a survey of the area last year.


While the insect seldom actually kills a tree, deformities and stunted growth due to weevil feeding, have reduced by 13 per cent the merchantable board feet of pole-type white pines now standing in the state. Reduction of sawlog timber from larger trees amounts to some 40 per cent. Entomologists point out that both conservation and protection of the timber crop, including efforts to prevent weevil feeding, must be made a part of white pine management.

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DR. JAMES L. HORSFALL, recently retired from American Cyanamid Co. after 25 years of service, has been named consulting entomologist for Geigy Company, Inc., New York. In commenting on the appointment, Dr. Horsfall said that in addition to his new duties, he expected to find time for activities such as fishing and traveling during the coming years.

THE SALESMEN'S ASSOCIATION of the American Chemical Industry has published the complete proceedings of the first chemical sales clinic, held last October in New York. The publication, a bound volume, runs to 128 pages and includes, in addition to the full texts of the prepared addresses, verbatim reports of the question-and-answer periods following each talk. Copies of the proceedings are available at \$1.50 per copy and may be obtained by writing the sales clinic chairman, Ralph L. Ericsson, 6 East 45th Street, New York 17, who says that checks must accompany all requests and should be made payable to the SAACI sales clinic committee.

SOME 5,000 TONS OF CHILEAN NITRATE has been purchased by the United Nations for distribution in South Korea, it was announced June 23. The fertilizer will be distributed among South Korean farmers to aid in greater agricultural output in that area. The same report indicated that the UN was also considering purchase of an additional 5,000 tons of the material.

BEMIS BRO. BAG COMPANY was to discontinue bag manufacturing operations at its Jacksonville plant on June 30, according to an announcement by H. T. Wehrenbrecht, Bemis director of southern operations.


The Jacksonville plant was established by Bemis in 1947 in anticipation of increased textile bag consumption in the Southeast, especially for citrus, fertilizer and commercial feed. This demand has not developed, however, largely because of a country-wide swing from textile to paper bags

and the increased percentage of the Florida citrus crop being sold in processed form, the company says.

MAGMA CORPORATION, Chicago, Ill., expects to expand production of its fertilizer products in the Denver, Colo. area, it has been reported. Executives of the company were seeking a location in the Denver area for a plant site. The firm hopes to erect a plant capable of producing 500 tons of fertilizer a day, according to Perry L. Halseth, president, and Eugene

Jaffee, secretary-treasurer. The product will be sold under the trade name of "Magnite".

UNION BAG & PAPER CORPORATION has announced the opening of a new Western sales office after June 1, 1953. The office will be located in the Victor Building, 6 West Tenth Street, Kansas City, Missouri. B. J. O'Hearn, Southwestern district manager for multiwall bag sales and W. H. Burget, sales representative, will headquarter in the new office.



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STAUFFER CAPTAN 50-W (contains 50% N-trichloromethylthio-tetrahydro-phthalimide). This is your chance to get in on the ground floor in selling this really exceptional new all-purpose fungicide. Stauffer CAPTAN 50-W (Fungicide "406") can be used alone or in combination with other fungicides on fruits, vegetables and other crops. Against scab on apples in 1952, CAPTAN 50-W gave superior control and delivered fruit with a satin-smooth finish. It also has been thoroughly field tested in hot weather and is recommended as the sole fungicide in the cover sprays without fear of burning. CAPTAN 50-W is a microfine wettable powder and will be commercially available in 1953 packed in 50 lb. wax-lined fiber drums and 5 lb. paper bags packed 10 to the carton.

STAUFFER SULPHENONE MITICIDE (A 50% wettable powder containing p-chlorophenyl phenyl sulfone). Here's a promising new product developed by Stauffer's Agricultural Research Division for the control of European Red Mite, Two-Spotted Mites and other Mites on fruit and other crops. Stauffer Sulphenone Miticide is a microfine material and is packed in 4 lb. paper bags.

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Write for samples and file number 629 for additional information on Marasperse. Our technical staff will welcome the opportunity to cooperate with you.

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Tests have shown MARACARB N, a new Marathon product, to be an excellent anti-catalyst for use in pesticide formulations. MARACARB N nullifies the catalytic activity exhibited by many carriers and thereby prevents decomposition of the toxicant. Write for Bulletin 118 and get complete information.



Pioneer Labels in Book Form

Pioneer Chemical Associates, Denver, Colorado, have prepared a complete collection of labels for various pesticides distributed by the company. According to J. Newton Hall, general manager, the labels represent the pesticide technical materials and concentrates that the firm has available for manufacturing purposes, or for rebranding and resale.

Ring bound in attractive form, the booklet is available from the company, 3035 E. Colfax St., Denver 6, Colorado.

Fertilizer Plant Information

Chemical and Industrial Corp., Cincinnati, Ohio, has prepared folders describing the Potasse et Engrais Chimiques method of manufacturing complex fertilizers. The continuous process featured by the company is neither new nor untried, it declares. Numerous PEC complex fertilizer plants are now in operation using a combination of nitric and sulfuric acid, nitric and phosphoric acid, ammonia and phosphoric acid, and one plant operating in excess of 300 tons a day, using a combination of nitric acid and carbon dioxide, it is claimed.

C & I Corp. has acquired the right to license these processes in the U.S. Further information is available from Chemical and Industrial Corp., 256 McCullough St., Cincinnati 26, Ohio.

Diamond Ups H. S. Curtis

Henry S. Curtis has been made manager of production and engineering of the Diamond Alkali Organic Chemicals Division. The appointment followed the recent resignation of Charles H. Kolker. Mr. Curtis will make his headquarters at the division's plant at Houston, Texas.

The new appointee is a native of West Virginia and holds degrees from Ohio State University. For a number of years, he was associated with Westvaco Chemical Division of Food Machinery & Chemical Corp. at So. Charleston, W.Va.

AGRICULTURAL CHEMICALS

Technical

BRIEFS

Parathion Loss in Sprays

Rapid loss of parathion from spray residues may be reduced by use of active carbon, which also acts as a safener and prevents foliage injury without reducing the efficiency of the insecticide. Two series of laboratory tests indicated that active carbon reduces parathion loss by about 15% after one week of exposure, 20-40% after three weeks of exposure, and 26 to 50% after five weeks. C. W. Aman, West Virginia Pulp & Paper Co., Tyrone, Pa.

Blue Tongue on West Coast

Blue Tongue, an important disease of sheep not formerly known in the United States, has recently been reported from California, Utah and Texas. It is believed now that it may have been present in the country for perhaps as long as fifteen years, although it was not positively diagnosed before 1952. Blue tongue is a virus disease transmitted by a gnat (*Culicoides*). Because it is spread by the gnat, the disease is seasonal in nature, making its appearance the latter part of the summer. It had not been known previously to exist outside of South Africa, Palestine and Cyprus.

In the 1952 outbreak in California the disease involved 25 ranches and about 15,000 sheep. Mortality of about 10% of the sheep affected was reported. No known treatment is effective against the virus, nor did quarantine prove effective in S. Africa. Vaccination seems to be the only method of control. In S. Africa all sheep are vaccinated once a year.

Dr. R. A. Alexander, director of veterinary services for the Union

of South Africa, was recently in the United States to advise the Bureau of Animal Industry on diagnosis and control of blue tongue. Under his directions a vaccine has been developed at the California Veterinary College, Davis, Calif., which will be available if the disease becomes an increasingly serious problem this season.

Squash Borer Control

Successful control of squash borer begins long before there is any sign of injury. In fact, when vines begin to collapse due to borer feeding, it is too late to do anything about control. A one per cent rotenone dust or one per cent parathion dust has been found to give good control of squash borers, providing the first application is made by the last of June at egg-laying time and is followed with three or four additional treatments at weekly intervals. It is recommended that home gardeners use rotenone rather than parathion. Progress Report #8228, N. Y. S. Agricultural Experiment Station.

Spray Machines Assessed

Spray practice in Connecticut tends more and more towards one-man operation and costs favor airblast machines because of speed of cover per man. Fuel saving is not a consideration since, in general, it costs more to run a mist blower than a hydraulic sprayer. Savings in water haulage, supply or pumping costs favor the mist blower operating on concentrates or semi-concentrates.

Moveable (hand-operated) outlets have some advantages for mist blowers, but also some disadvantages. Fix-

ed outlets are faster, especially if operated from both sides of the machine, but do not reach the tops of trees more than 20-25 feet high unless adequate velocity and volume are provided. In general, the "hang-on" blower is not provided with enough power, but there are some exceptions. Improvements in manufacture have been continuous and rapid.

Drop sizes of 50-100 microns seem to be indicated (for 2 to 6X concentration), since very small sizes do not settle readily and the very large sizes drop out quickly and are not suitable for concentrate mixtures.

Performance of mist blowers during at least two years, one average, the other severe as regards pest control, is about equal to the average hydraulic sprayer, that is, with adequate velocity and volume. The ability to cover the orchard faster has naturally brought some improvement in control where mist blowers have replaced older hand-operated hydraulics.

—Summary of "A Study of Spray Machines in Connecticut Orchards" by Philip Garman, Connecticut Agricultural Experiment Station, New Haven, Bulletin No. 567.

Soil Conditioner Studies

Studies undertaken at the New Jersey Agricultural Experiment Station at Rutgers University, New Brunswick, N. J., on various problems connected with the use of soil conditioners were reported on by S. J. Toth, associate professor of soils, in a recent talk at Newark, N. J., before a section of the American Institute of Chemists.

Surveys of the aggregation effectiveness of various soil conditioners on the market during 1952 indicated wide variation between products, which was related to recommended rates of application, nature of the polymer, relative viscosity and nature of cations associated with the polymers. In general, relative viscosity and cation exerted marked influences on aggregation. Large changes in Na content did not exert as much effect as changes in Ca, Prof. Toth reported.

Preliminary greenhouse studies indicated that liquid acrylic polymers were superior to co-polymer powders

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AGRICULTURAL CHEMICALS

in increasing germination percentages of small seeds, when polymers were used as crust preventors. Solutions of co-polymer conditioners are equally as effective as liquid acrylates for crust prevention. For depth aggregation on problem soils, powders seem to be superior to solutions of conditioners because of the difficulty of thoroughly incorporating the liquids into the soil mass.

Studies of water loss from co-polymer and acrylic conditioned soils showed that this loss, corresponding solely to evaporation, was greater from the acrylic than co-polymer conditioned soils even though the surfaces of the soil conditioned with co-polymers appeared to be drier. This behavior is attributed to the "mulching effect" of the co-polymer treated soil.

The possible role of liquid and powder conditioning chemicals in agriculture was also discussed by Prof. Toth. If manufacturers of soil conditioning chemicals are interested solely in reaching the home gardener, he indicated that it does not matter if the soil conditioning chemical is sold in liquid or powder form as long as the polymer produces effective soil aggregation and if the directions for use call for working the soil mechanically after application, if depth aggregation is desired. From the viewpoint of large scale application by the farmer, with machinery now at hand, liquids are troublesome to apply, whereas powders can be applied with the fertilizer spreader and disced into the soil.

Nitro Studies on Orange Trees

MATURE orange trees grown for nine years without nitrogen fertilizer were compared with a similar group, which had received four pounds of inorganic nitrogen per tree per year in two applications. For eleven years preceding the start of the test, all the trees had received three pounds of nitrogen per year. . . one-half in the form of manure. At the end of the nine year test period, there were no significant yield depressions, and the leaves were not

below the 2 per cent critical level for nitrogen content. There was less than 15 per cent difference in the leaf levels in spite of large differences in nitrate accumulation in the root zone of the soil. The nitrogen application resulted in decreased accumulation of potassium, phosphorus and manganese, and increased calcium. M. H. Kimball, R. T. Mueller and H. V. Welch, Univ. of California, *Proc. Am. Soc. Hort. Science* through *Chemical Abstracts* 47, No. 11, 5603.

Dieldrin for Holly Leaf Miner

Spraying newly developing holly foliage with dieldrin once or twice at two-week intervals between May 21 and June 5 should prevent infestation under most conditions. When spray treatments are delayed until early summer, aldrin or lindane, 25 per cent emulsions applied to miner-infested holly foliage about July 25 at the rate of two quarts per 100 gallons of water or 4 teaspoons per gallon will kill the miners. A more complete kill may be expected from aldrin. J. C. Schread, Connecticut Agricultural Experiment Station, New Haven, Circular #568.

DDT For Cucumber Beetle

Although DDT has been found very effective in the control of cucumber beetle, indiscriminate use will result in an increase of the spider mite or melon aphid. To obtain economic control with the fewest applications, and at the lowest possible dosage, it is recommended that not more than one pound of actual DDT per acre be used. On some varieties of melons, DDT can be used in combination with aramite or ovotran, if a serious spider mite population is anticipated.

Successful control of cucumber beetle can be obtained with a two per cent parathion dust applied at 30 pounds per acre. Tetraethyl pyrophosphate, applied as a one per cent dust at the rate of 30 pounds per acre, has also shown promise, as has a five per cent malathion dust

at 25 pounds per acre. Dieldrin, aldrin and heptachlor are all effective in controlling cucumber beetles, but to the present time they have not been released for use on this crop. Of the three, dieldrin has shown the most promise for use in the melon insect control program. A. E. Michelbacher, W. W. Middlekauff and O. G. Bacon, *J. Economic Entomology* 46, #3 p. 493-394 (1953)

Hydrocarbon Herbicides

Investigations of pure hydrocarbons as herbicides, in connection with effect on plants and the nature of tolerance exhibited by certain plants to these oils, indicated that entrance and movement of an oil in plants are conditioned by the degree of toxicity of the oil to the plant in question. A highly toxic oil enters indiscriminately from the point of contact and its spread within or through the plant is negligible. Non-toxic oils, or those relatively so, enter entirely or largely through the stomata and usually spread widely throughout the plant.

Chlorophyll destruction in plants is one of the most visible symptoms of oil injury. This is shown to be due primarily to high light intensity, the oil acting indirectly on the plant to break down the plant protoplasm in some way that exposes it to the destroying effect of light. Light intensity, at the time of and subsequent to spraying, is found to be an important factor in toxicity. High light intensity substantially increases the toxic effect of oils on both susceptible and tolerant plants.

Studies have indicated that there is a correlation between the ability of an oil to form emulsions and its toxicity to plants. High solvency for resins, gums, phenolic compounds, etc., is associated with plant toxicity; low solvency is associated with plant tolerance. Aromatics and paraffins, respectively, are good examples of the correlation between high chemical activity and plant injury, or low chemical activity and plant tolerance. S. Dallyn, Cornell University, *Agricultural Exp. Sta. Bulletin* #316.

Literature Available

The following list reviews a series of bulletins on fertilizer, insecticide and fungicide recommendations, controls, etc. For the most part, these bulletins and reports are prepared by the various state agricultural experiment stations, and copies may be obtained by writing directly to the respective stations.

THE GOLDEN NEMATODE by W. F. Mai and B. Lear. Symptoms and signs of the disease on potatoes and tomatoes. Discussion of other plants affected. Protection of uninfected areas; spread; soil sampling, control. 34 pages, Bulletin 870 Cornell Extension, N.Y. State College of Agriculture, Ithaca, N. Y.

MUSKMELONS AND WATERMELONS by J. Carew, C. Chupp and R. W. Leiby. Review of how to grow plants, summary of the varieties, manure and fertilizer, harvesting, diseases, and insects. 12 pages, Bulletin 878, May 1953, Cornell Extension, N. Y. State College of Agriculture, Ithaca, N. Y.

MULCHES FOR THE HOME GARDENER by C. B. Raymond. General discussion of mulching directed to the home gardener. 4 pages, Bulletin 886 Cornell Extension, N.Y. State College of Agriculture, Ithaca, N. Y.

FACTS ABOUT FERTILIZING BLUEBERRIES by C. A. Doehlert. General recommendations of formulas, when and how to apply, special conditions. 7 pages, Circular #550, February 1953, by N. J. Agricultural Exp. Sta., New Brunswick, N. J.

CONTROL OF WINTER ANNUAL WEEDS WITH xx 3-CIPC IN A STOOLBLOCK OF MALLING APPLE ROOTSTOCKS by R. F. Carlson and H. B. Turey. Results of test made during fall application. Materials and methods. 3 pages. Reprint from quarterly bulletin 35, #4, May 1953 of the Michigan Agricultural Exp. Stat., East Lansing, Mich.

DISEASES OF STORED CARROTS IN NEW YORK STATE by W. E. Rader. The various diseases encountered in storage are reviewed; illustrations of damage, and control recommendations given. 64 pages, Bulletin #889, October 1952, Cornell University Agric. Exp. Sta., Ithaca, N. Y.

TOP WORKING AND BRIDGE GRAFTING FRUIT TREES by E. G. Fisher. Essentials of grafting. Grafting procedures, care after grafting, protection of graft, selection of limbs. 15 pages, Bulletin 882 Cornell Extension, N.Y. State College of Agriculture, Ithaca, N.Y.

FORMATION AND DEVELOPMENT OF THE NORWAY SPRUCE GALL

CAUSED BY *Adelges abietis* L. by G. H. Plumb. The Gall problem in general. Nature of the stimulus. Norway Spruce Gall, materials and methods, origin and development, enzymes, maturing of gall, control. Bulletin 566, January 1953. Connecticut Agricultural Exp. Sta., New Haven, Conn.

Japanese Beetle Control

Treatments applied to turf to kill Japanese and Asiatic garden beetle grubs, using DDT, chlordane, aldrin, methoxychlor, heptachlor, toxaphene, BHC, isodrin and endrin, all gave good control for at least one year. BHC lost its effectiveness at the end of a year and normal amounts of toxaphene at the end of two years. Isodrin and endrin have been tested for only one year.

Parathion gave almost complete control of grubs at .5 to 2 pounds per acre in less than two months, when treatments were made in late summer. The chlorinated hydrocarbon compounds are superior to the organic phosphates, from a residual activity standpoint. Lindane used in comparison with isodrin and endrin, at .5 to 2 pounds per acre, compares favorably in ridding turf of grubs during the season in which it is used. Data on residual effects are not yet available.

Treatment and fertilizing may be done at the same time. Insecticides in dust form may be diluted with fertilizer at the rate of one pound of dust to two pounds of fertilizer and applied to turf. J. C. Schread, Connecticut Agricultural Experiment Station, New Haven, Bulletin #184.

Forbes Scale Studies

In studies and observations from 1950 through 1952, parathion, malathion, and Metacide used in summer applications were the most effective in control of Forbes Scale. Dormant oil sprays reduced Forbes scale, but did not give complete control. Materials that gave poor reductions of Forbes scale or none at all were endrin, EPN, Systox, the triethanolamine salt of dinitro-*sec*-butylphenol, and diethoxy phosphinothioyl ethyl ethylphosphonate D. W. Hamilton and S. A. Summerland, American Association of

Economic Entomologists, December, 1952, annual meeting at Philadelphia.

Weed Control in Beets

C.M.U. looks very good as a pre-emergence treatment for weed control in beets, based on early 1953 tests, according to A. R. Hamson, extension specialist in vegetable crops, Cornell University, Ithaca, N. Y., reporting in the June 1 issue of *Cornell Veg-News*. Weeding costs of an acre of beets may be reduced to approximately one-fifth of the usual cost of \$40 to \$80 an acre by employing the C.M.U. treatment. However the following cautionary suggestions are offered by Mr. Hamson:

1. C.M.U. reduces the stand of beets on certain soils—especially the lighter soils of low organic matter content. There has been no reduction when applied exactly at the rate of $\frac{3}{8}$ pound per acre of active ingredient. C.M.U. must be applied with extreme accuracy because an overdose will result in serious injury to beets and lesser amounts will give poor weed control.

2. Taste tests conducted in 1952 on canned beets where C.M.U. was used for weed control indicate a difference in flavor, color, and perhaps texture, but these differences were not necessarily objectionable, at least as indicated by preliminary tests. More complete testing will be required before canners will run the risk of losing a pack of beets treated with C.M.U.

3. Residue and toxicology tests to warm blooded animals and man of treated beets have not been completed so that C.M.U. is not cleared by the U.S. Food and Drug Administration. Thus the manufacturer is not recommending its use on crop land. It is registered for use only as a soil sterilant on non-crop land.

These reservations should not be considered as prohibitive of a possible eventual widespread recommendation and use of C.M.U. for weeding beets. It is mostly a case of insufficient information to go beyond our present suggestion that C.M.U. be used for trial only.

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Effective Herbicide Use

Application of weed killers to the lower leaves of a plant produces more effective results than when the herbicide is applied to the upper part of the plant, according to Dr. Alden S. Crafts, Univ. of California, Davis. With actively growing young plants, Prof. Crafts discovered the weed-killer moves into the root system from all the leaves, making this stage of growth the best time for spraying. *Science News Letter*, June, 1953.

Tomato Russet Mite Control

In laboratory experiments where 28 materials were tested for effectiveness in controlling tomato russet mite, parathion, Metacide, Compound R-242, toxaphene, p-chlorophenyl p-chlorobenzene sulfonate (K-6451) and endrin appeared to be as effective as sulfur, which is the recommended material. Malathion, isodrin, dieldrin, DDT, heptachlor, chlordane, and aldrin were nearly as effective as sulfur. Aramite, Compound CS-708, DMC, lindane, methoxychlor, bis (p-chlorophenyl) ethynyl carbinol, TDE and four diluents were relatively ineffective. T. P. Tuft and L. D. Anderson J. *Economic Entomology*, 46, #3, p. 504 (1953)

Cabbage Bursting Control

Control of insect pests on cabbage was found to reduce the amount of bursting of heads by almost 50 per cent, in tests at the N. Y. Experiment Station, Geneva, N. Y. (Progress Report #8227). Yields are increased substantially with fertilizers, but increasing the amount of fertilizer increases the amount of bursting unless insect injury is held in check at the same time. Beneficial effects of insecticides were noted in the tests regardless of the amount of fertilizer used.

Yields of marketable heads increased from 18 to better than 24 tons to the acre by increasing the rate of application of a 5-10-10 fertilizer from zero to 1,800 pounds to the acre. However, the number of burst heads also increased with in-

creasing amounts of fertilizer. Different sources of fertilizer ingredients had no effect on yield or bursting.

Control of cabbage worms, aphids, and thrips with dusts added almost 3 tons to the acre to the yield where no fertilizer was used and 5½ tons where 1,800 pounds of a 5-10-10 were applied. At the same time the number of burst heads was reduced almost half.

Fungicide Spray Studies

In 1951, a series of small replicate plots was established with some interested growers and 14 fungicides were applied as concentrated mist spray, using all materials at 8x concentration. Plant injury, in the form of leaf burning, was prevalent on the plots treated with inorganic copper, phenyl mercury materials, and the mixed glyoxalidines ("Fruit Fungicide").

Copper-zinc-chromate ("C. C. 658"), copper 8-quinolinolate ("Bioquin I"), copper dimethyl dithiocarbamate, and zinc in the form of "Parzate" fungicide, all showed some control of plant defoliation and increased

the yield rate so that the treated plots produced up to 20 bushels per acre more than the untreated controls.

"Phygon," "Cop-O-Zink" and copper mercapto-benzothiazole gave slightly better disease control and yields were increased about 25 bushels per acre over the untreated controls. Ferbam in the form of "Fermate" fungicide, "G. C. 1198", "G. C. 11-24", and ziram in the form of "Zerlate" fungicide, gave the best control, so that increases in yield ranged up to 45 bushels per acre when compared with the untreated controls.

This work was done on small plots where plant variation can complicate such yield data. In larger plots of 2 to 4 acres each, ferbam in the form of "Fermate", as a 10% dust, gave increases in yield of 34 to 39 bushels per acre. In these large-scale plots ferbam was the only dust used, but on one of these trials "Phygon" was also included as concentrated mist spray at 8x concentration and resulted in an increase of 14 bushels per acre over the untreated controls.

Summary of "Organic Fungicides and Low Bush Blueberry Production in Maine", by M. T. Hilborn, in *DuPont Agricultural News Letter*, May-June, 1953.

New Books

Case Studies in Commercial Chemical Development by J. E. Ullmann. Published by Chemonomics, Inc., New York. 134 pages, 6 x 9 inches, paper bound, price \$5.00.

A description of the methods by which several products have been developed by the chemical process industries, how they have been tested and finally placed on the market is presented in this text. Included are such chemicals and products as aerosols, toxaphene, krilium, orlon, vicara, and glyoxal. Although interesting, the book seems to be overpriced.

Mineral Deficiencies in Plants by T. Wallace, published by Chemical Publishing Co., Inc., New York. 250 pages, 6 x 9 inches, cloth binding, price \$10.00.

Following a 108 page text section, which describes the significance and appropriate treatment of plant

nutritional deficiencies, is a series of more than 300 full color plates which are invaluable in illustrating plant deficiency problems. Charts and tables in the text provide further descriptive material.

Transactions of the Illinois State Horticultural Society and the Illinois Fruit Council for the year 1952. Edited by H. J. Hartley. Published by the Society, 290 pages, 6 x 8¼ inches, cloth binding.

As indicated by the title, the complete transactions of the 1952 reports for the Illinois State Horticultural Society and Fruit Council are presented in a bound volume. Included are minutes of the various meetings of the Board of Directors, business and special sessions, constitution, list of officers, reports on fruit insects, and fruit diseases; effect of potash deficiency on the Elberta peach; 1952 fruit program; progress reports on soil moisture and on fruit tree nutrition, etc.

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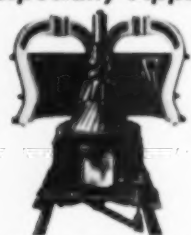
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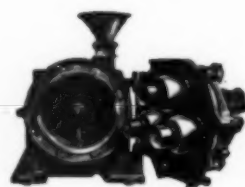
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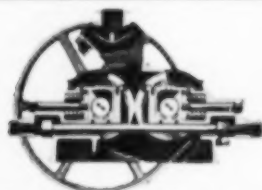
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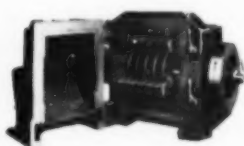
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Through the SIFTER...

MANUFACTURERS of basic insecticidal raw materials report that over recent months, the U. S. Food and Drug Administration has been shutting down closely on the experimental use of new toxic compounds. Under the existing law, manufacturers developing new toxic materials are supposed to be allowed to sell small experimental quantities for testing purposes. However, apparently pending some definite action on new legislation, Food & Drug is reported to be loath to permit such sales even for experimental use. Inability of entomologists to get such deliveries of new toxic materials for test purposes can, of course, be a severe handicap which could put further stumbling blocks into the already difficult job of developing and testing new pesticidal materials.

* * *

The Blue Tongue disease of sheep is currently raising much concern in the cattle raising regions of Texas and California. It is believed that the disease is transmitted by a gnat (*Culicoides*). The disease has apparently been noted here for a period of perhaps as long as 15 years but has only recently become acute enough to attract much attention. Losses to herdsmen were reported quite severe last year. The Bureau of Animal Industry recently brought over from Africa an authority on the disease, Dr. Alexander, in an attempt to get the benefit of experience from that area where the disease has been known for many years. Dr. Alexander has developed a vaccine which has proved effective in protecting sheep from the disease. The Bureau is currently exploring the situation regarding blood-sucking gnats which information may lead to successful control in the areas affected.

* * *

Dr. Charles E. Palm, who served as the last president of the American Association of Economic

Entomologists prior to its merger to form the new Entomological Society of America was presented with a certificate at the recent Pacific Branch meeting of E.S.A. held at Lake Tahoe, California. Reminiscent of the 90-day wonders created by the U. S. Navy during the recent war years, Charlie was cited as a 13-day wonder since this was the extent of his term as the final head of the A.A.E.E.

* * *

Over 300 were registered at the Pacific Branch meeting of E.S.A. which was held in Connelly's Bijou Inn. Cities being considered for next year's meeting are Victoria, B. C., Canada; Seaside, Ore.; and Payette Lake, McCall, Idaho. While the actual meeting place will not be selected until later, sentiment at the meeting seemed to be inclined in favor of the Canadian locale.

* * *

Dr. W. M. Hoskins of University of California who moderated a panel discussion at the Lake Tahoe meeting on the topic "The Evolution and Development of a New Insecticide" advanced the suggestion that entomologists and others in the agricultural insecticide field should avoid the term "off-flavor" unless it is definitely applicable. He suggested that more often, particularly in cases where only a minor variation in flavor has occurred, it would be much more accurate to refer to "flavor alteration." He suggested that the stronger term "off-flavor" might more accurately be reserved for use where flavor of insecticide-treated vegetables or fruits is definitely bad. Some chemicals, he noted, merely change the flavor, or perhaps even improve it, and in cases of this kind, the term "altered flavor" would be more accurate than "off-flavor."

* * *

Notes for the Librarian—The latest monograph of the Thomas Say Foundation is entitled "Aphids of the

Rocky Mountain Region." It has just been published. Further details from Prof. J. J. Davis of Purdue University, Lafayette, Indiana, chairman of the foundation.

"Insects Close Up" is a new book to be published this summer. It is the product of Dr. Edward S. Roos, curator of insects at the California Academy of Sciences. It will be published by University of California Press and will show a series of photographs of living insects in normal postures, the pictures being taken without interrupting normal field activities of the insects.

* * *

A 1953 summary of the effectiveness of different pesticides and a panel discussion of the various methods of weed control with particular reference to cotton will be featured at the Central California Agricultural Forum meeting at Fresno State College July 29.

Dr. Guy F. McLeod, vice-president of Sunland Industries, will moderate the discussion on pesticides. Assisting on the panel will be Gordon L. Smith, University of California; Dick Break, L. R. Hamilton, Inc.; Dr. A. C. Sessions, California Spray Chemical Corp.; Luther Jones, University of California; Ed Swift, University of California Extension Service; and Bill Shilling, Sunkist Growers.

Bill Harvey, Extension Weed Control Specialist, will lead another discussion on "Cotton Weed Control". Principal emphasis will be placed on control of Russian Knoxweed and Morning Glory. Chemical and electrical control will be discussed.

Murray Pryor, State of California, Department of Agriculture; W. J. Wolgamott, California Electrical Farm Service; Chet Conley, Merced County Farm Advisor; Harry Schmall, Mendota; Herbert F. Miller, Jr., Agricultural Engineer, Bureau of Plant Industry, U.S.D.A.; Robert Drake, Coberly and Plumb Agricultural Chemicals, Hanford; and Richard Price, Mid-State Chemical Supply Company, Fowler; will discuss cotton weed control and be prepared to answer questions from the floor.



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SYSTOX is Chemagro's trademark name for a formulation of O, O-diethyl-O-2-(ethylmercapto)-ethyl thiophosphate, the remarkably effective systemic insecticide which was developed by Farbenfabriken Bayer, the inventor of parathion, and which Chemagro is licensed to manufacture in this country.

To make it easier for the many scientists who are experimenting with SYSTOX and who do not like to incorporate trademark names in their reports, the common name "demeton" is being used by Chemagro to designate the active ingredient of SYSTOX.

Chemagro therefore respectfully suggests the use of the common name "demeton" in scientific reports, rather than the use of the commercial trademark SYSTOX. If the word SYSTOX is so used, we request that a statement be included to the effect that it is a trademark of Chemagro Corporation.

We wish also to express our deep appreciation to the many agricultural scientists who are continuing to test demeton, and whose findings to date indicate that demeton is a revolutionary insecticide of great economic importance.

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Haude to Midwestern Firm



W. J. HAUDE

William J. Haude, recently-resigned president of Pittsburgh Agricultural Chemicals Co., New York, has announced the formation of Inland Chemical Co., with headquarters at 75 E. Wacker Drive, Chicago, Ill. The new firm will manufacture and distribute agricultural chemicals in the midwestern states and in addition expects soon to offer a new synthetic protein to the cattle market.

The new firm will be affiliated with Central States Fertilizer Co., which has plants operating at key points in northern Illinois and southern Wisconsin at present. The company distributes liquid ammonia fertilizer materials through custom franchise applicators under a five year contract, Mr. Haude reports. Considerable expansion is planned in this phase of the business, he says.

With Mr. Haude in Central Fertilizer, is co-owner Arthur Carnes. Manager of the ten operating plants, is Charles Farr. Headquarters are in Chicago, but the firm maintains field offices at Aurora, Ill. and Lamont, Ill.

U.S.I. Opens Allethrin Plant

U.S. Industrial Chemicals Company, Division of National Distillers Products Corp. has announced full scale production of allethrin at its new plant in Baltimore, Md. According to W. P. Marsh, Jr., U.S.I. president, the new plant, the world's first for production of allethrin, has already reached its rated capacity after having begun operations last fall.

Mr. Marsh spoke at the first public inspection of the complicated engineering and chemical operation necessary for the duplication of some of the merits of pyrethrum. Those making the inspection included representatives of the Department of Agriculture and the Department of Defense.

Calling allethrin "an important defense item," Mr. Marsh said that its present use in supplying the insecticide needs of the Armed Forces "provides compelling evidence of our faith in the future of allethrin for other than military uses."

"In case of necessity, allethrin can be used for nearly all the purposes for which pyrethrum would normally be employed," Mr. Marsh said. "It is made from raw materials readily available in the U. S. in any necessary quantities. Ample supplies of allethrin will be available to the armed forces with no dependence on foreign sources of supply and no limitations on quantity."

Another speaker, R. B. Stoddard, coordinator of insecticide operations for the company, commented that the commercial production of allethrin presents both a challenge and an opportunity, not only to insecticide manufacturers, but also to the Federal and State agencies which establish the pattern of insecticide use.

Ammonia Group Meets

A meeting of the Agricultural Ammonia Institute was scheduled to be held on July 9 and 10 at the University of Missouri, Columbia, Mo. Main subject of the meeting was to be the off-season application of anhydrous ammonia. Actual field experiences from different areas of the U. S. were to be reported and pictures of results were scheduled to be shown, according to information from Jack F. Crisswell, Memphis, Tenn., executive vice-president of the Institute.

CSMA to Washington in Dec.

The Chemical Specialties Manufacturers Association, Inc. will hold its 40th Annual Meeting in Washington, D. C. on December 6, 7, 8, 1953, at the Mayflower Hotel.

Bachman Davison V-P



DR. PAUL W. BACHMAN

Davison Chemical Corp. has announced the election of Dr. Paul W. Bachman as vice-president. The new appointee was formerly director of research and development and will continue in charge of these activities.

Dr. Bachman joined Davison in 1949 as manager of development planning. He has been active in technical aspects of the company's current plant expansion program, including the triple superphosphate plant now building at Bartow, Florida.

He is a native of Virginia and holds a Ph.D. from Johns Hopkins U.

Joins Westvaco Sales Staff

Robert R. Dean has joined the Technical Sales Staff, Westvaco Chemical Division, Food Machinery & Chemical Corporation, New York, where he will work upon special development assignments. He is a graduate of Indiana University.

Nitrogen Plant Under Way

Nitrogen Division, Allied Chemical & Dye Corp. reports that construction work on its new ammonia plant at La Platte, Nebraska, is under way with production scheduled for next spring. The site was acquired some months ago but actual construction had been postponed until assurance of an adequate gas supply had been given.

Northern Natural Gas Co., Omaha, is now authorized to supply gas on an uninterruptible basis. About 75,000 tons of anhydrous ammonia a year will be produced at the plant.

Del-Mar-Va Meeting Held

The Del-Mar-Va Peninsula Fertilizer Association held its annual meeting at the George Washington Hotel, Ocean City, Md., June 27. Dr. Firman E. Bear, chairman of the Soils Department, Rutgers University, New Brunswick, N. J. addressed the group on "Some New Ideas on Soil Organic Matter".

A luncheon at the hotel was held following the morning session, and the group spent the afternoon in social activities which included ocean bathing and other recreation.

FARMING LOOKS AHEAD

(Continued from Page 41)

In 1952 approximately 16 percent of our people who live on farms received only 8.7 percent of the national income. This included both farm and non-farm income. Getting down to dollars and cents figures the average per capita net income of persons living on farms from both agricultural and non-agricultural sources was \$924 in 1952 while the per capita net income of the non-farm population was \$1,827 or practically twice as much. This is the lowest percentage since 1942.

Big Job Ahead

LET'S look for a moment at the requirements which this country may be expected to make of its farmers in the years immediately ahead. To me they look rather formidable.

First our rapidly mounting population means that more production will be needed each year unless we reduce our standard of living. In 1940 there were 131 million people in this country. Today we have almost 160 million, and at the present rate we will have 175 million by 1960.

But that is not the whole story. Our per capita consumption of food today is 13 percent above pre-war. Our agricultural exports have been and are substantial. We have used these exports as an instrument of foreign policy in our world-wide campaign against Communism. This campaign is still going on. We continue to have a hungry world, and figures show that the world population is in-

creasing today more rapidly than the world's food supply.

Any way you look at it — whether from the standpoint of our domestic needs or that of meeting the threat of Communism and alleviating hunger through food exports — the farmers of this country have a real job ahead.

In spite of the fact that we may have temporary surpluses from time to time, we recognize that for the reasons I've already stated the farmers' job is to produce more agricultural commodities. With this in mind, we can well inquire as to what our production facilities are now and how much they can be expanded. Well, to begin with, we have as much agricultural land in this country today as we will ever have. We will bring some new land into cultivation through reclamation, all of which will be costly as far as price is concerned. But for every new acre we bring in that way, we're going to lose an acre through the normal expansion of our urban centers, the widening of our highways, the building of airports, the construction of recreation areas, and building dams and reservoirs.

In other words, the only way we can expand production in this country is by increasing the productivity of our present acreage. That means we must not only conserve what we have, but must restore the fertility of the land which we have already lost. That costs money. It means farmers are going to have to buy more farming equipment. They are going to have to follow better farming methods. They are going to have to buy far more fertilizer. Capital investment as well as operating expenditures will be still further increased.

That kind of program can be carried on only if there is assurance of a stable income. Unless the farmer has some idea of what to expect in the way of prices he will in many cases hesitate to incur the risk involved in making the heavy expenditures which will be required to finance such programs.

I do not think we can blame farmers for wishing this assurance. Nor do I believe that there is any

real difference of opinion among informed people on this question. For many years both political party platforms have endorsed price support programs. Farm legislation in Congress has been enacted very largely on a nonpartisan basis. Republicans from the Middle West and Democrats from the South have worked side by side in trying to solve these problems as far as it could be done by legislation.

(Part II Appears Next Month)

PACIFIC ESA

(Continued from Page 57)

product Mr. Flebut emphasized, must have shelf life. That is, it must be usable after possible long storage. It must also be compatible, he warned, with the materials and program which the farmer is currently using.

Panel—Cooperation between Research Workers, Extension Service and Industry

PARTICIPANTS in the panel included the following: L. A. Carruth, University of Arizona, Tucson; R. D. Eichman, Stauffer Chemical Company, Portland; G. F. Knowlton, Utah State Agricultural College, Logan; G. F. MacLeod, Sunland Industries, Fresno; P. O. Ritcher, Oregon State College, Corvallis; Mike Swoboda, New Mexico Agricultural Extension Service, and John E. Swift, University of California, Agricultural Extension Service, Berkeley (moderator).

Various speakers emphasized that it is the job of research to get basic information. Specific problems involved with various crops, pest species which attack the crops, and area variations where there are local conditions which may change control recommendations, must be known.

Extension covers a wide area. Its primary aim is to educate the County Agent, train him, and keep him informed of methods best suited for control of problems in his particular area; to work in cooperation with research people; to prepare news and radio publicity. It is necessary for the County Agent to evaluate research findings in a way that the

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farmer can understand. To function effectively, the extension entomologist needs the cooperation of the experiment station workers, the U.S.D.A. people, industry and all others concerned. No one man can know all the things expected of them—in the way of information.

The objective of industry is to help the farmer make a profit in his operations. A sale is never made until the customer is satisfied and comes back year after year.

Exchange of information between research people and industry workers was deemed necessary by several on the panel and they deplored the idea of "closed sessions" found at many conferences. Other individuals pointed out that in certain cases they felt that if industry people were included, no recommendations would be made in a reasonable time.

At present there are two basic types of meetings; the "Cornell system" which brings extension, research and interested industry personnel together for a three-day meeting where common problems are discussed and where final recommendations are decided. "California system" where meetings are held in specific areas. This has been found to work better there, because of the local variation in crops and pests and climatic conditions. Here extension, research and industry representatives meet, and common problems are discussed. It was the opinion of panel members that recommendations should be flexible enough to meet individual conditions in specific areas, and not necessarily be the "final" answer.

"Grants in Aid" have both good and bad features. They are a definite benefit to the College with a limited budget. If the money comes from an impartial foundation, such as the Rockefeller foundation, there would be no feeling of obligation towards the product of the donor. The experiment station should be able to stand on its own feet, and not rely entirely on "grants in aid" for its research programs. If grants are accepted, they should tie in with programs the station would normally do, provided they had the funds.

Panel—Control of Ectoparasites on Livestock.

Leader—Dean Furman, University of California, Berkeley.

THE cattle warble is still a difficult problem. Local efforts to encourage control of this pest have been rather discouraging wherever they have been tried. The Bureau of Animal Industry has set up several demonstration areas in various parts of the country. They found it difficult to get cooperation from all stockmen in these areas. Where the program has been followed, excellent control has been obtained.

Investigators at the Kerrville, Texas laboratory of the U.S.D.A. have been conducting a series of chemotherapeutic tests on first-instar cattle warble larvae. Several thousand materials have been screened, but to date none of these appear too promising. Materials which killed the larvae would also kill the mouse host used in these tests. In South America, chlordane and certain isomers of BHC have had a chemotherapeutic effect on a closely allied species of warble.

R. W. Every, extension entomologist, Oregon, reported on the relation between ticks and anaplasmosis in Oregon. The Rocky Mountain Spotted fever tick (*Dermacentor andersonii*) is the primary vector. Trials are now under way in Oregon to work out a control program against this tick. If the tick can be controlled, the spread of anaplasmosis will be stopped.

A. W. Lindquist, B.E.P.Q., U.S.D.A., Corvallis, Ore., reported on horn flies. Their studies show an average weight gain of from 60 to 70 pounds per head for animals protected from flies for a two to two and one-half month period during fly season.

Simplified program—Based on use of a cable 15-20 feet long wrapped with burlap sacking which has first been impregnated with an oil solution of DDT. On beef cattle a 25% DDT emulsion is diluted with stove or fuel oil to a 5% concentration. The diluted liquid is applied at the rate of about one to one and one-half gallons per cable. Results in a

majority of cases have been excellent and the fly population reduced from over 200 per head to none for several weeks; in one case they have had protection for 70 days.

The oil hazard is negligible, as only a very small amount of oil gets on each animal. It was emphasized that crankcase or heavy oils should not be used. Location of the device is important—it should be placed where animals congregate.

R. S. Bushland, B.E.P.Q., U.S.D.A., Kerrville, Tex. pointed out the important point of the low DDT residues found on cattle which had used these devices. It usually averages less than 1/10th that found in animals sprayed by conventional methods.

Dr. Richard Painter, Dominion Entomological Laboratory, Lethbridge, Alberta, Canada, stated that their methods of stock handling differ slightly from those used in many areas in the States. There, community pastures are used and they frequently run as many as 8,000 head together. Horn fly control is done by spray aimed at the top line of the animals. An 8-nozzle spray boom is used and the animals are run through a funnel-type chute under the boom. With this method an average of 1,000 head per hour can be sprayed. The amount of spray used per head is about 1/10 gal. The chemical used is a .5% DDT made from wettable DDT powder. Their spray season is rather short and three applications are all that is needed. Cost for seasonal treatment will average about 11.6¢ per head.

Dr. Hugh Manis, University of Idaho, Moscow; outlined developments of sheep spray control program there. This was initially begun to control a wood-tick problem. No dipping vats are used in Idaho, and the liquid spray program used on cattle was modified for use on sheep. This spray program is now widely used on sheep ticks. Materials used are DDT and lindane.

R. S. Bushland reported that the chief Texas problem is Gulf Coast Tick. Dipping vats are largely used there. Toxicants are .5% toxaphene or .5% DDT plus .025 to .03%

gamma BHC or lindane. DDT alone won't get the engorged ticks. Some states in the South recommend .5% toxaphene plus .025 to 0.3% lindane, which results in a quicker kill.

Mr. Bushland also reported on x-ray experiments for control of screw-worm flies. Biological studies show that these flies normally mate but once. Laboratory work confirms the theory that x-ray sterilized flies will mate with normal flies, satisfy their mating instinct; eggs will be laid

from this mating, but will not hatch. Results in the laboratory were 90% infertile eggs. Field tests, where treated flies were liberated to mate with "wild" flies, and eggs recovered from wounded "trap" animals, resulted in a production of sterile eggs of 40 to 60%. The normal range of this fly is limited by cold weather to a portion of Florida in wintertime. It is their hope that if massive liberations of x-ray treated flies are made during the period when heavy concentrations

are found—control, or at least a great reduction in numbers may be gained.

G. F. Knowlton, Utah State Ag. Coll., Logan, reported that the spinose ear tick is becoming more of a problem there every year, and becoming more wide-spread.

Symposium—Absorption and Translocation of Insecticides in Plants

A. S. Crafts, Univ. of California, Davis, described how the movement of systemic materials in plants corresponds with that of herbicides which are translocated in the plant system. Basic studies of phosphates in the plant indicate that they will be moved from the roots to the upper plant parts, if the phosphate content is in balance. The material will then be re-circulated and moved back down to the roots, from which place the movement may again continue. As certain of our systemic materials are of a phosphate composition, this theory is of great interest.

Dr. R. W. Metcalf, Univ. of California, Riverside, outlined the history of systemic materials, beginning with the findings in this country of Poos and others that wheat grown in soil containing selenium was not affected by aphids (1936). This was followed by work of Schrader with fluorethyl alcohol in 1936-7. Neiswander in 1940 used sodium selenite on roses to keep down red spider and aphids. Schrader in 1940-41 worked with BFPO and OMPA, Ripper in 1950 with published theories of several materials and 1952 Gasser of Geigy with dimetan and pyrolan.

The esters of carbamic acid (isolan-pyrolan) are non-phosphorous compounds, water soluble, and can penetrate plant leaf surfaces readily. They are effective on aphids and similar pests, but ineffective on mites.

Residues of systemic materials break down at a different rate, depending on the plant in which they are used. Thus complete biochemical studies are essential on these materials.

As to the future of systemics, Dr. Metcalf is optimistic as to the place they will hold. They can be applied with much less equipment, should be more economical to apply,

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and will extend the residual effect to the point where possibly but one seasonal application may suffice. Regulatory officials will of course need more data on the plant metabolism of the various systemic materials.

Work to date has resulted in gaining valuable knowledge of the plant mechanism, and will be an aid in the future development of all types of insecticides. Chronic hazards of systemics are not very great. They are dangerous principally to the applicator. Residues of 2 ppm might be permissible. The chlorinated compounds offer a much greater hazard.

E. S. Silvester, University of California, Berkeley, discussed "Feeding of Insects and Virus Movement in Plants," emphasizing that in order to kill the virus of infectious diseases, insecticides must be present in lethal concentrations.

R. C. Scott of Pittsburgh Agricultural Chemical Co. took up the subject of residues of systemic insecticides. He said that the determination of residues of systemics is somewhat more difficult than for other insecticides. However, he feels that residues will in the final analysis be no more severe a problem than for other types of insecticides. The first problem in residue studies on systemics, he indicated, is to determine the chemical nature of the metabolite. Biological methods have been employed, the first method tested being the mosquito larvicide method. However, it has proved to be not quite sensitive enough. Another biological method is now being studied, based on determination of inhibition of cholinesterase. This method is currently giving satisfactory results and may present possibilities. A third method also being employed with considerable success is the use of radioactive isotopes.

Mr. Scott indicated his belief that in the near future, some systemics may be registered for use on foods.

W. Scott James also of Pittsburgh Agricultural Chemical Co. discussed residue, registration and marketing problems with systemic materials. In his opinion, marketing problems on systemics offer no particular

difficulty. He feels that such insecticides as parathion have paved the way for the systemics, as the insecticide trade has been trained in safe handling or at least a satisfactory start has been made in this direction. Applicators have been cautioned as to the dangers involved with the new systemics, doctors have been warned on possible dangers and methods of treating cases where the new materials are involved.

Mr. James commented also,

that "Systox" is being packed in comparatively large containers, with one gallon cans as the minimum size. This was done with the thought of keeping the product out of hardware stores and out of the hands of the general public, to minimize the hazard which could result from widespread, general and uninformed usage.

AMONG the invited speakers was Avery S. Hoyt, chief, Bureau of Entomology & Plant Quarantine,

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U.S.D.A., Washington, D. C., who spoke on "The Future Development of the Bureau of Entomology & Plant Quarantine." Dr. Hoyt prefaced his remarks by listing some of the most important past accomplishments of the century-old profession of entomology as follows:

(1) The development of more effective insecticides in recent years which has made it possible to control some and to get better control of other injurious insects that attack man and his possessions.

(2) The improvements in methods and equipment for applying insecticides, particularly in concentrates. Aircraft, aerosols, and improved ground equipment have materially assisted in the economic application of insecticides.

(3) The use of natural enemies in the control of insects and weeds. Outstanding examples of effective biological control are available right here in California.

(4) The almost phenomenal yields of some crops that have been obtained through the use of pollinating insects.

(5) The development and widespread use of crop varieties which are resistant or tolerant to attack by some of their major insect enemies and which are both agronomically acceptable and adapted. Development of cultural practices such as dates of seeding, clean cultivation, crop rotation, fertilization, selective cutting of forest trees, and similar methods have contributed greatly to the reduction of insect damage.

(6) The dissemination of information on insects and their control to the public through the Extension Service, publications, radio, television, motion pictures, and other media has been a significant contribution in the acceptance and use of pest control measures.

(7) The outstanding contributions by American entomologists to techniques for identification of insects.

(8) The role of insects as vectors of plant diseases has been established. In some cases where the vectors are known, the incidence of disease has been greatly reduced by controlling the vectors.

(9) The cooperative large-scale control and eradication programs supported by private, state, and Federal funds have resulted in the eradication of such pests as the Mediterranean fruit fly, Parlatoria date scale, and have greatly reduced economic losses from such insects as grasshoppers, Mormon crickets, white-fringed beetles, and gypsy moths. California has conducted, with striking success, a program started in 1946 to eradicate the Mexican bean beetle from Ventura County. The citrus blackfly was eradicated in the early thirties from Key West, Florida.

(10) The development of vacuum fumigation and other treatments, including time, temperature, applications, where-by the importation or movement of plants

and plant products under quarantine may be accomplished without risk of spreading injurious plant pests, thus providing a maximum of protection to agriculture with a minimum of interference with commerce.

Turning to the future, he indicated that in the field of entomological research the Bureau will continue to play about the same part it has in the past: (1) Helping out where there is regional interest; (2) filling in gaps where necessary work can not be accomplished otherwise as the situ-

ation requires, and (3) carrying on a certain amount of fundamental research for the benefit of all or most entomological research workers and which, for one reason or another, may well be handled by Federal workers.

In the field of plant quarantine he noted that increased use of airplanes has brought critical problems, and that another serious problem is the adequate safeguarding of importation of plants and plant prod-

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ucts. "Exclusion," he believes, "is not the answer and reliance must be put on inspection and on methods of disinfection and disinfestation on arrival at ports of entry." He suggested that inspection of airplanes at points of origin rather than at points of entry may lead to more effective quarantine enforcement in the future. Trial is also being made, he reported, of the inspection of imported bulbs at point of origin rather than at point of entry. At least on bulbs it has been found that fewer men, at lower cost, working in the country of origin before the bulbs are packed, can make a more thorough inspection and actually see more bulbs than can be inspected on the docks at point of entry.

In the field of control, Dr. Hoyt indicated that there has been a complete change in the Bureau's approach to this problem over recent years. With the necessity of achieving effective control, at a reduced cost, there has been a trend toward greater participation by those who derive direct benefit from the control measures, namely the individual grower, the industry affected, and the states. In the field of grasshopper control, for instance, "Federal funds are no longer being made available to participate in control programs directed against grasshoppers on crop lands. On range lands where the situation is somewhat different and where large areas may be threatened by populations of grasshoppers that might build up and from which they might migrate to crop areas, it has seemed practicable to continue active Federal participation." Organized control programs are currently being handled on the basis of contributions of one-third the cost by the land owner, one-third by the State, and one-third by the Federal Government. A similar philosophy is developing. Dr. Hoyt noted, with respect to control of forest insects.

Ray F. Smith, University of California, Berkeley, served as program chairman, with Robert W. Underhill, Dow Chemical Co., San Francisco, as chairman of the arrangements committee. Bob Watwood of

Soil Serv. Inc., Salinas and Paul Dresher of American Chemical Paint Co., San Jose, did a fine job of representing the arrangements committee at the registration desk.

DEFOLIANT

(Continued from Page 43)

ate defoliant is the chlorate radical itself. Theoretically then, other salts

of chlorate might be as effective, or even more effective, than sodium chlorate. Pennsylvania Salt Manufacturing Company, with many years of experience in the manufacture of chlorates and chlorate compounds, selected several with characteristics which might be promising for defoliation. Of the chlorate combinations tested, one of these containing magnesium chlorate hexahydrate appeared most promising from the stand-

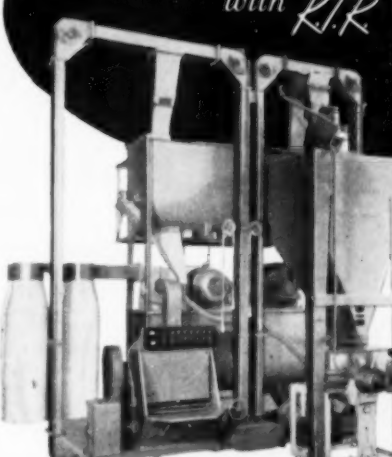
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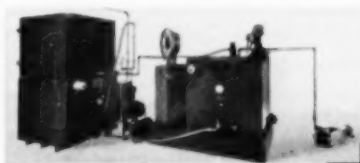
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Many of the largest insecticide producing companies and smaller processors alike have substantially increased production, improved quality and reduced production costs with these factory-tested units. These Ready-To-Run plants mix, blend and package dry, free flowing, powdered materials, including many formulas involving liquid impregnation.

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SAN FRANCISCO, SEATTLE, TULSA, MEXICO CITY AND (ETHYL ANTIKNOCK, LTD.) TORONTO.



point of solubility, hygroscopicity, stability, and reduced fire hazard.

The formulation was deliquescent at humidities below 25%, it was water soluble in excess of six pounds per gallon of solution, and burning tests indicated that the formulation selected was more repressive to combustion than some of the other combinations being used commercially.

This magnesium chlorate formulation was field tested in 1951 in California and Arizona. It was tested primarily as an aircraft-applied spray and for comparison with the then available chemical defoliant. Due to its marked hygroscopicity, it was also applied in dust form in an attempt to take advantage of the superior penetration characteristics of dusts. Results of these tests under varied climatic and growing conditions indicated that magnesium chlorate applied as a spray was at least on a par with sodium chlorate-borate, with magnesium chlorate giving faster action in most cases. The dust formulation gave rather erratic results, but some plots looked good enough to warrant another season's testing.

It was decided to introduce a magnesium chlorate formulation on a semi-commercial scale in 1952 under the trade name "Penco DE-FOL-ATE." Both a liquid form as well as the dry granular powder were used to represent the range of tests and commercial usage. The granular powder involved slightly higher costs but these more than offset certain disadvantages of the liquid. These disadvantages were principally, but not limited to, the typical chlorate corrosion on steel containers and inconvenience of handling in the field. The granular product can be packaged in fibre drums meeting ICC specifications relating to chlorate formulations.

Use of the material on well over 150 acres in 1952 confirmed the results of the 1951 tests. Faster action was observed under most conditions and final defoliation was equivalent to other chlorate type defoliant. The tests also substantiated the other advantages of the material in addition to the faster action. These include very high water solubility, which reduces

mixing time, and freedom from boron.

The application of cotton defoliant where the major tests were conducted by Pennsalt, was primarily by airplane. Growers, applicators, and manufacturers alike desire a defoliant which can be applied from the air and reach the maximum of the foliage of the cotton plant so that it can rapidly and uniformly defoliate the plant. This product appears to fit these requirements substantially.

The magnesium chlorate when put into solution permitted the equipment aboard the plane to spray fine droplets of hygroscopic material which air currents delivered to the cotton plant. The rapid and high solubility of the magnesium chlorate formulation simplified the job of spray preparation and its hygroscopicity kept it in an effective state after reaching the leaves of the cotton plant.

Consider Plant's Condition

MANNER of application of defoliation material is quite important, but by all odds, the most important single factor affecting defoliation is the condition of the plant itself. Subtle chemical balances within the plant tissue as well as major physical characteristics such as plant temperature are no doubt responsible to a large degree for seemingly inconsistent results in the field. These chemical balances are related to weather conditions, length of growing season, fertilizer program, water supply, and the like, and are not too well understood in their effect upon plant response to chemical defoliant. It is no doubt also true that different chemical defoliant vary somewhat in their requirements for causing optimum defoliation.

Due to rather wide differences of growing conditions of plants even within the same field, it is sometimes difficult to draw conclusions from a single series of defoliation test plots. When a single field test plot is used, it is only the most carefully controlled experiment that can give results significant enough to make reliable comparisons.

For best results with magnes-

ium chlorate type defoliant, cotton plants should be mature. Since squares will continue to set until harvest in plants growing under some climatic conditions, cessation of flowering is not a reliable indicator of maturity. The same can be said for stage of boll development except that bolls which the grower hopes to pick for lint should be fully mature although not necessarily opened prior to defoliation. A grower may test boll maturity by cutting with a pocketknife. Mature bolls cannot easily be sliced through.

Estimation of maturity of the cotton plant is largely a matter of experience and visual observation. In defoliable fields, there is a slight yellowing of the foliage and a cessation of growth associated with depletion of nitrogen. The leaves are attached less firmly and may be pulled off with a clean break by a downward pull.

Defoliation of water stressed cotton will almost invariably cause leaves to dry up and freeze to the stem rather than drop off. This is typical of most defoliant and therefore, it falls upon the grower to prevent water stress if possible. Drought stressed cotton has a droopy, limp appearance to the leaves, and the leaves are warm to the touch on a hot day. Leaves on a normal cotton plant are always cool to the touch and have a crisp, turgid appearance.

It should be mentioned that defoliation of lodged cotton can usually be expected to cause a certain amount of trash when the lint is picked. This is because the leaves after separating from the stem cannot fall to the ground. Defoliation of lodged plants will sometimes cause them to straighten up, but this cannot be expected in every case. Although lodged plants do not usually defoliate as completely as normal ones, the use of a defoliant is needed most in this situation to reduce boll rot and ease the problem of mechanical picking of plants which have fallen over.

Under normal conditions of moisture and plant maturity, a dosage of 10 pounds per acre of "De-Fol-Ate" (58% magnesium chlorate hexahydrate) was found to be sufficient.



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For very short cotton the dosage may be reduced slightly, and by the same token, extremely rank or lodged plants may require 12 pounds per acre or two applications of six to eight pounds per acre. If two applications are made, the second should be applied after the full effect of the first, or about seven to ten days. Growers with unusual conditions should seek local expert advice.

The customary amount of spray per acre for aircraft applications has been 10 gallons if the 10 pound acre chlorate dosage is used. The reason for this ratio is largely a historical one, the older type chlorate-borate formulations being soluble only to the extent of one pound per gallon of water. Actually, because of the higher solubility of magnesium chlorate formulations, a lower spray volume per acre can be used. This in turn increases the effective pay load of the plane and increases the ratio of flying to filling time. It should be pointed out, however, that if lower gallonages are used, fine droplet size becomes increasingly important in order to distribute the concentrated materials to lower foliage.

Timing Important

THE time interval between application of defoliant and defoliation of the plant will vary with weather conditions and to some extent, plant vigor. High temperatures increase plant activity and reduce defoliation time. The usual interval in warm weather is five to eight days and in cool weather may be 12 days or longer. If very few bolls are open at the time of application, a few more days may be needed after leaf fall to allow the bolls to open. Bolls open faster in warm, dry, sunny weather.

Under some conditions there will be active regrowth of leaves after defoliation. These young succulent leaves are crushed by the cotton picker and result in lint staining. Regrowth is a natural effect if moisture and plant food are available and if the weather is warm. One method of suppressing regrowth in the case of irrigated cotton would be to time the last water application so that suffi-

cient moisture is not present for additional growth. While this method has merit and is effective in many situations, care must be taken that the plants are not in water stress at defoliation time since this will cause the typical freezing-on of the leaves as mentioned previously.

The method of suppressing regrowth that is favored by most authorities is careful timing of nitrogen application so that this plant food is exhausted at harvest time. Low nitrogen stores will also improve defoliation.

The fruiting habits of cotton are such that squares and bolls continue to be produced through the season. This results in an extended harvest period, and ordinarily would mean several pickings, since open cotton must not be left to the weather indefinitely. Due to the high initial expense and depreciation of the mechanical pickers, a large proportion, perhaps all, of the crop should be removed in one trip through the field. Defoliation has produced a side effect which contributes more to practical machine picking than its original purpose of preventing lint-staining and trash. This effect is the uniform opening of ripe bolls brought about by sunlight and dry air circulation after the green leaves are removed. Even in fields picked by hand, defoliation is becoming common practice to increase the amount harvested per man-day. This is especially true where spot labor shortages exist.★★

WASHINGTON

(Continued from Page 65)

him an outstanding record of accomplishment. As senior entomologist in charge of the Bureau's Orlando, Florida laboratory during World War II, he led in the development of methods and materials that today are in use in the American home, by our Armed Forces, and by other nations to control disease-carrying insect pests. This research and direction in the field of medical entomology earned for Dr. Knippling the Medal of Merit. He was also commended by

the Navy Department for this work that change the entire methodology for control of insect-borne diseases, and in 1946, was presented by the Secretary of Agriculture, the United States of America Typhus Commission Medal. He received the latter award for his scientific contributions toward the control of insects responsible for spreading typhus. These achievements that protected Allied Service men from pest-borne diseases during World War II caused Great Britain to award Dr. Knippling—His Majesty's medal for Service in the Cause of Freedom.

* * *

Ralph A. Sheals, as Assistant Chief of BEPQ in charge of all administrative functions is also retiring. During the three and one-half years that Mr. Sheals has held this post, he has instituted and carried out several major organizational changes that have greatly improved the efficiency and effectiveness of the Bureau's operations.

Mr. Sheals began service with the Department of Agriculture in 1917 and from that date until 1928 was employed on white pine blister control work. He joined the Bureau's Division of Domestic Plant Quarantines in 1928 and from 1929 until 1942 was assistant leader of that Division. During this period he shared in the work of organizing quarantine inspection of plants and plant products in transit, and aided in the direction of extensive cooperative control campaigns against such important insect pests and plant diseases as grasshoppers, chinch bugs, citrus canker, phony peach and peach mosaic.★★

•

Nitrogen Needs are Met

Upon recalculating U. S. capacity to produce phosphate fertilizers, the Office of Defense Mobilization has ruled that no more tax amortization certificates will be issued for phosphatic fertilizer plants. The office states that we now have enough capacity constructed or planned, to meet previously set production figures. O. D. M. says that the capacity of plants for which tax amortization certificates have been issued, or which

are being completed without assistance, is 1,300,000 tons. The only chance for receiving a certificate of necessity for any type of phosphate plant will be based on failure of a present certificate holder to go ahead with construction on schedule.

APFC MEETING

(Continued from Page 39)

"It seems clear to those of us who are working on range that the ten million acres of grass range (in California) will profitably absorb a great amount of fertilizer in the future," he said. "Later, as our brush areas are cleared by fire or mechanical means, fertilizers will play an increasing part in maintaining good growth of newly seeded species of grasses and legumes on these lands. As more irrigation water becomes available in California, we will expect a greater extension of irrigated pastures into the foothill lands, which we know will require both nitrogen and phosphorus for maximum utilization. On existing grainlands, we feel that great increases in yield can be brought about with fertilization with nitrogen and phosphorus."

Mr. Klemme discussed the status of soils in Missouri, indicating that they all lack one or more of the essential nutrients. This need must be made up by application of fertilizer materials which always give the highest possible returns. Soil tests in 89 counties of Missouri lead the way, he said, and indicate the exact need of the soil. Fertilizer can be applied at any time equipment may be driven into the field, he said, and this is done largely by truck in bulk.

Many corn growers in the area are confirming arguments that it is far more profitable to fertilize and get yields of 100 bushels per acre than it is to "save" on fertilizer and get a yield of 60 bu. There are many 100-bushel growers in some 50 counties of Missouri, he said.

The largest potential, however, lies in pasture fertilization. The addition of milk output alone would add millions to farm income in the state and would provide more food

for tens of millions of people. "Giving the land the full treatment" is the recommendation of the college for Missouri farmers, he said. Soils can thus be deepened, organic matter will increase, tilth will be improved, erosion stopped and better income and better health will result.

In the southeastern states, fertilizer consumption is on the increase, according to Mr. Woodle, who followed the Missouri specialist on the panel. "Fertilizer brings its users a

return ranging from \$3 to \$18 for every dollar invested", he reported. Growers in the area are using about a million tons a year, whereas 2½ million tons are recommended for best results. Following such a program would increase crops from 20% to 200%, he said.

To find the maximum, rather than the minimum profitable use of fertilizer should be the goal of research, Mr. Woodle asserted. More study is needed on placement, the

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use of insecticides in fertilizers and on the importance of minor elements.

Grassland farming, particularly in the southeast, is of prime importance. The southeastern states could produce more beef than the entire United States is now producing, he said, if pasture fertilization were taken seriously. The protein content of grass could be increased from 7% to 13%, he said, and other favorable factors also enter into the picture. One pound of nitrogen is equal to two pounds of beef, he said, and added, "That's cheap beef!" The fertilizer ratio for pasture application is also changing. The present ratio of 1-1-1 is likely to change to 4-1-2, but a ratio of 3-12-12 is being recommended for pastures.

Moving northward to the northeastern states, the next panel speaker, L. H. Smith, announced that there has been a "forage revolution" in his section of the country, with more lime and fertilizer being used than ever before.

High-analysis fertilizers are being applied with excellent results, Mr. Smith reported. Analyses of 10-10-10, 0-15-30 and other high-grade plant foods are used and farmers have found it advantageous to place fertilizer in two and even three applications.

As a result, pastures are in excellent shape and fine cooperation is shown between interested groups such as fertilizer dealers and feed dealers. "Fertilizer salesmen are doing a great deal of good in that area", he declared. He also pointed out that the fertilizer salesman of today needs to know much more than the price per ton and how to write out an order. "The farmers want to know much more about the content and action of plant food than any order-taker can tell them," he observed.

DR. T. K. Cowden, head, Department of Agricultural Economics, Michigan State College, East Lansing, predicted that "agricultural net incomes will be lower in 1953 than in 1952, by something like ten percent." He added that

Board Members Named

Eight new members were elected to the APFC, Board of Directors for a three-year term which expires June 30, 1956. They are: J. J. Joyce, Reliance Lime and Fertilizer Corp., Norfolk, Va.; C. Cecil Arledge, Virginia-Carolina Chemical Corp., Richmond, Va.; W. C. Stark, Atlantic Fertilizer Corp., Riverhead, N. Y.; George E. Pettit, Potash Company of America, Washington, D. C.; P. J. Prosser, The Baugh & Sons Company, Baltimore, Md.; John E. Sanford, Armour Fertilizer Works, Atlanta, Ga.; A. D. Strobhar, Southern Fertilizer and Chemical Co., Savannah, Ga., and J. Albert Woods, Commercial Solvents Corp., New York City.

an additional decline may be expected in 1954, but following that, "agriculture may be headed for a period similar to that which existed between 1922 and 1929." This period featured "fairly good industrial activities, and farm costs remained relatively high in relation to prices received by farmers."

"It is wholly unrealistic, in my judgment, to expect farm returns to continue at the levels that have existed during most of the past inflationary decade", he said. "From 1942 to 1952 farm prices averaged 107 percent of parity. Parity is that price of farm products that will give them the same purchasing power as they had during the base period, usually 1910-14. We are in danger of worshipping at the shrine of parity to too great a degree. In the 43-year period, from 1910 to 1952, farm prices averaged 95 percent of parity. If we omit the two world war periods, World War I and World War II, farm prices averaged

90 percent of parity. Leaving out the great depression and the war periods, they averaged about 93 percent of parity. It is my judgment that somewhere between 85 and 95 percent of parity is a more normal relationship between prices received and prices paid by farmers than the so-called 100 percent of parity. Now this has nothing to do with what is fair or what the farmers ought to have. I simply think this is a more realistic appraisal of what is likely to exist.

Citing estimates that at least 25 percent of the farm output in the United States is directly attributable to the chemical fertilizers, Dr. Cowden described the fertilizer industry as "a very important segment of the American agricultural economy" which "has contributed materially to scientific production."

"Agriculture has changed a great deal since pre-World War II," he said. "Farm output has increased around 40 percent. Total man hours used in agriculture have decreased 17 percent. The use of farm machinery has increased 76 percent. The use of major plant foods is up 230 percent. The acres of crop land have remained practically unchanged. Crop production per acre has increased 29 percent. The American people are today virtually eating on science, and they will do so to an even greater degree in the future."

"Our new technologies in agriculture are requiring more and more capital and larger farms in order to operate efficiently," he emphasized. "This does not mean big corporation farms, but larger commercial farms. On the other hand the farmer with an efficient operating unit that is in a position to equip it in terms of modern know-how should be able to get along in a rather satisfactory manner during the next decade."

Dr. Cowden said that "a progressive agriculture with millions of individual farm businessmen making individual decisions as how to operate their farms, how to adjust to changing conditions in an attempt to obtain the largest profit, is one

APFC Executive Committee

The Executive Committee of the American Plant Food Council, is as follows, the APFC has announced:

W. T. Wright, vice-president, F. S. Royster Guano Co., Norfolk, Va., chairman.

Horace M. Albright, president, U. S. Potash Co., New York; W. B. Copeland, Smith-Douglass Co., Norfolk, Va.; Edwin Pate, Dixie Guano Co., Laurensburg, N. C.; and P. J. Prosser, Baugh & Sons, Baltimore, Md. James F. Doetsch, retiring chairman of the executive committee, now becomes an ex officio member.

of the greatest assets that this country possesses.

Again emphasizing that "the fertilizer industry plays an important part in efficient agricultural production," he said that despite the fact that sales have increased rapidly, in many instances the use of fertilizer by farmers has not even come close to approximating the amount recommended by experts. Therefore he reasoned, fertilizer sales should expand.

Pointing out that "selling has been too easy for the past ten years", Dr. H. H. Maynard, professor of marketing, Ohio State U., Columbus, declared that business is entering upon a period which will emphasize sales efficiency as the pre-eminent factor in sales success. "The allocation psychology must give way to creative selling", he said.

Urging management to get among the customers at least once a month, Dr. Maynard observed that too much time spent in the office can allow company executives to get out of touch with problems of their salesmen. He advised executives to find out how their products rate with customers; if the salesmen are pleasing customers; if delivery schedules, prices, and advertising helps are satisfactory.

"How can you train your new man if you yourself have not sold your product for many months?" he asked the fertilizer men present. "Maybe it's been so long that you have forgotten just how tough it is to sell out on the first line," he added.

Warning against overwork, overworry and against getting lost in work, Dr. Maynard declared that if an executive has two telephone lines plus an inter-communications system on his desk, he is a slave to details. One possible solution may lie in using more line assistants, he suggested. "More organizations spend too little money on management assistants than too much", it was noted. "Staff assistants of several types can be of great assistance and may even guide managements at many points."

Nearly 500 persons attended the annual APFC banquet on Saturday night at which president Truitt acted as chairman. Main speaker of



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Glycol • Chlorinated Solvents • Synthetic Detergents • Agricultural Insecticides • Soil Conditioners
Other Organic and Inorganic Chemicals

the evening was Hon. Walter H. Judd, Minnesota Congressman who outlined "Political Horizons" of the present day. He reviewed events surrounding the Korean war and pointed out significant developments which reveal the over-all Communist plan of world conquest.

The United States must remain strong and united to combat effectively the insidious propaganda and moves of the Kremlin. Rep. Judd warned that no matter how peaceful Russian talk may sound, their objective is still that of wrecking democracy and the establishment of a world dictatorship. Any talk of peace is merely expedient for the moment, to gain a point, he said. In this regard, the Congressman said, their system is to create a feeling of relaxation on the part of the democracies and allow them to become apathetic. Moscow also has a way of stirring up excitement in one country to distract attention from some other part of the world where events of real significance are taking place.

He reminded the business men present that private enterprise is impossible under communist rule and that the successful American system of business is one of the major obstacles standing in Russia's way at present.

NAC BIRTHDAY

(Continued from Page 59)

Institute for Plant research, Yonkers, N. Y., will contribute some observations on fungicides and their relation to agriculture. President Mohr will preside.

The committee in charge of arrangements is headed by Wallace S. Moreland, NAC consultant. Other members of the committee are: H. C. Koehler, Monsanto Chemical Company, St. Louis, Missouri; A. F. Bixby, Pennsylvania Salt Manufacturing Company, Philadelphia, Pennsylvania; P. J. McManus, G. L. F. Soil Building Service, New York; and John Rodda, U. S. Industrial Chemicals Company, New York.

Election of officers and some members of the board of directors

will be held. There are fifteen members of the board including the president who automatically becomes a member upon completion of his term.

SUPPLIERS BULLETINS

(Continued from Page 61)

tion. Entitled "Udet F Surfactants in Acidulation," the bulletin describes the anti-caking action of the product. Write for Bulletin #54, Universal Detergents, Inc., 1825 E. Spring St., Long Beach 6, Calif.

SAFETY PUBLICITY

(Continued from Page 53)

Poster Location

ONCE on hand, the posters have to be placed strategically in the plant. It is an interesting study to figure out where to put a given poster. Where will it be seen most often? Will the ones who need its message be able to spot it frequently enough for its message to soak in?

There could be irony in the placement of safety messages, too. Imagine tacking up a poster that says:

"For a safe lift - bend knees
- lift steadily, no jerking - feet
and body in good position; don't
twist - keep load close, don't over-
reach - get help when necessary
- don't strain yourself."

- in a runway where the truck driver tries to read it while racing past. Before he'd get half way through, he would probably have run his vehicle up the side of the building or over the toes of fellow-workers.

Short, "flash" type posters like "Drive Carefully" would be far more appropriate for places where traffic is moving. The long-worded variety is splendid for wash rooms, stock rooms, smoking areas and lunch rooms. Here some of the workmen might spare the extra time to read a lengthy treatise. . . and it might be time well spent.

Advertising specialists say that certain arrangements of patterns are attractive to the eye, while conglomera-

tions of colors and shapes tend to repel the glance of the viewer. Thus, the manner in which posters are displayed is important. A board or frames should be provided for displaying. . . and of all things, they should be illuminated or at least placed where light strikes them. Dingy signs aren't carrying any message. It is like winking at a girl in the dark. . . she knows nothing about it, and thus nothing is gained.

For the management that wishes to publicize safety in a BIG way, the NSC has for sale what it calls "Jumbo" posters which measure 11 feet 8 inches wide by 9 feet 11 inches high. They come in eight sections for easy mounting. Any company having an entire side of its plant not in use might be interested in shouting safety to all who pass by.

Looking back over this subject of safety publicity, and in summary, a few points should be remembered: first, publicity for safety covers the entire waterfront of methods, media and even "stunts." The idea of safety must be carried to all levels of the fertilizer industry through publicity, or education. It must start with the management and be executed from the top, with the assumption that management itself is completely and thoroughly sold on the idea. Once this is done, the program well under way and success in sight, outside publicity may be obtained through local newspapers to bring the program to the attention of the public.

The most important thing is that a real program must be launched with the complete backing of management in carrying it out. This will mean improvement in working conditions in some cases, and in all events, necessary safety equipment like goggles, masks, gloves and respirators must be available as concrete evidence that the company's safety program means business.

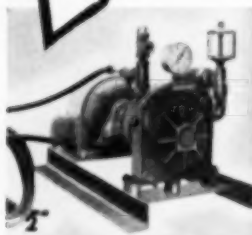
A popular song now going the rounds, has in its title the essence of what we're trying to do publicity-wise. "Tell Me a Story" is the plea, and that is our job. Workers in the fertilizer field all up and down the line are anxious to be told a story of

HAVE YOU OVERLOOKED ANY OF THESE IDEAS?

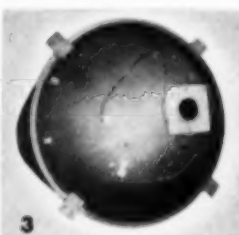
There are places in your fertilizer plants where low-cost Johnson accessories can profitably increase the efficiency of your bulk-material storage, batching and blending operations . . .



1 Pivoted Distributor
feeds materials to multiple-section bins. Turns, locks by ground-level control.



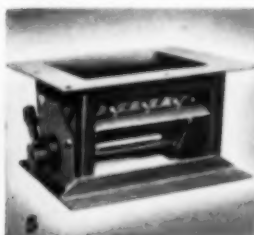
2 Rotary Vane Compressor
supplies 7 cu. ft. air pressure per min. to aerate silos, bins. 15-lb. limit-relief valve.



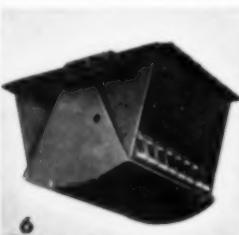
3 Aeration Fittings
properly spaced in storage bins and silos keep bulk materials fluid, free-flowing.



4 Bin Gauges and Signals
accurately register "hi-lo levels". Automatic. Water and dust-proof.



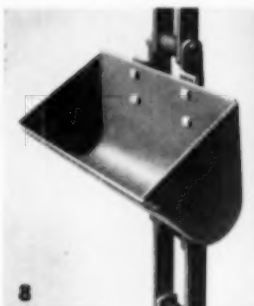
5 Rotary Plug Valve
controls flow of finest materials. Plug works freely in self-aligning bearings.



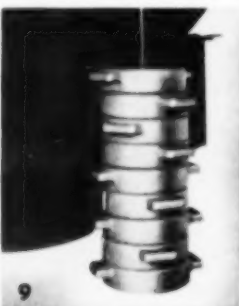
6 Fill Valves
single-clam, radial-type, have choker weights on closing edge for jam-proof closing.



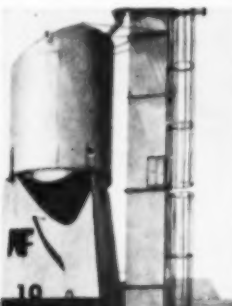
7 Receiving Hoppers
all sizes, types for box-car, hopper-bottom car, truck, or bag delivery. Weather-tight.



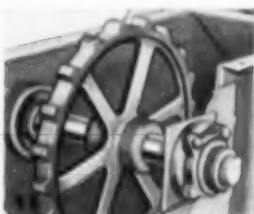
8 Elevator Buckets
all-welded, light, smooth. Two types, 7 sizes. Steel chain has carburized knuckles.



9 Batcher Test Weights
are available in sets of nine, 50-lb. calibrated units, and two 23-lb. steel hangers.



10 Elevator Safety Cage
28-in. diameter ladder safety cage, welded to casing, costs only a few dollars per foot.



11 Chain Sprockets
19-tooth chilled-iron cast iron with heavy split hub; 12-tooth cast-chrome manganese.

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S. C. Fertilizer Meeting

The annual South Carolina Fertilizer meeting was to be held at the Pee Dee Experiment Station, Florence, S.C., July 16. The meeting was to begin at 8 a.m. with the crowd being conducted over the station grounds. Of special interest, according to the advance program, were to be observations of plant food deficiency symptoms, fertilizer experiments, breeding and variety tests and results with various insecticides in controlling cotton and tobacco insect pests.

Speakers scheduled for the day's program included Hon. R. M. Cooper, president, Clemson board of trustees; Dr. Poole; Dr. H. P. Cooper, director of the experiment station; D. W. Watkins, director of the S. C. extension service; J. T. Lazar, district extension agent, Florence, S. C.

The subject of fertilizer placement and recommendations was scheduled for the afternoon, with a talk by H. A. Woodle, leader, in extension agronomy, Clemson, and a demonstration by G. B. Nutt and J. H. Anderson of the S. C. Station.

Minor element problems were to be discussed by W. R. Paden and N. R. Page; Tobacco fertilizer recommendations by J. M. Lewis; and Insecticide problems and equipment, by Dr. M. D. Farrar, State entomologist.

NFA REPORT

(Continued from Page 47)

gen leaching because of the combination of irrigation and rainfall, this may well result in greater use of the slower-leaching, ammoniacal forms of nitrogen such as urea or anhydrous ammonia.

In concluding his portion of the panel, Dr. Parks asserted that supplemental irrigation will continue to expand either with or without research. The expansion, however, will be more rapid, healthy and profitable if it comes with adequate agronomic research. "And there can be no doubt that a continued expansion in supple-

mental irrigation is very much in the interest of the fertilizer industry", he concluded.

Continuing the discussion of the subject, Mr. Ferguson talked on "Application of Fertilizer Through Sprinkler Irrigation Systems." He said that the method opens to the fertilizer industry "a field for greater development of commercially prepared and packaged soluble or liquid fertilizers of all analyses."

In outlining the advantages to be derived from use of sprinkler systems to apply fertilizer, Mr. Ferguson pointed out the obvious saving of labor in combining irrigation with fertilization. Another favorable factor, he said, lies in the fact that close control can be maintained on placement depth of fertilizer as well as on later distribution, and also that the plant food is already in solution and hence more quickly available to the plants.

A system of two valves may be used to introduce the plant food into the irrigation system, Mr. Ferguson explained. A factor to be considered is the corrosive effect of various fertilizers materials on different metals. He reported that stainless steel alone, as compared to galvanized iron, sheet aluminum, phospho-bronze and yellow brass, withstood the corrosive effect of four days' immersion in solutions of fertilizers at the rate of 1 lb. per gallon. He added, in this connection, that the strength of the fertilizer solution used in this test was much greater than would ever be used in normal application.

Discussing the application of anhydrous ammonia via the sprinkler system, Mr. Ferguson said that there have been reports of plant burn and also loss of nitrogen from the solution discharged by the sprinklers. "On the other hand", he said, "many people who are well informed on the reactions of anhydrous on plants believe that anhydrous ammonia can be distributed successfully by sprinkler systems so long as the concentration is held quite low. Low concentrations should also reduce losses of nitrogen from the spray." He added that until such time as methods have been developed and proved, irrigation techni-

cians and dealers will probably refrain from recommending the use of anhydrous ammonia in this way.

Other problems enumerated included that of surface sealing on heavy-textured soils, caused by ammonium nitrate, ammonium sulfate and urea when applied through sprinkler systems. Reports from Oregon have indicated that ammonia forms of nitrogen are deposited in the top two inches of soil, while nitrate fertilizers will percolate downward with the water.

Final speaker on the panel was Mr. Camp who related many instances where irrigation of various types has paid off quickly and easily and has afforded their investors good profit. That this is true not only in the arid southwest, but also in other parts of the country, was reiterated by the California operator. "It is my conviction, based upon my own personal experience and observation, that supplemental irrigation is the most important single thing now offered for the improvement of agriculture in the rainfall belt — areas having annual rainfall of 30 to 50 inches."

Mr. Camp repeated numerous case histories where mediocre yields had been increased greatly through irrigation, and added that other areas can profit also by this means. "By intelligent and more scientific use of fertilizers, insecticides . . . and in many areas, most important of all, supplemental irrigation, these farms can more than double the crops grown on them today".

Morse Gives Report

ASSURING the convention that "The future for agriculture was never more secure and full of promise", True D. Morse, Under-Secretary of Agriculture, Washington, D.C. declared that "surpluses" should be dealt with as opportunities rather than as problems. "We should be thankful that we have this abundance instead of the hunger and meager existence that plagues three-fourths of the world's population", he said.

This abundant production enables us to expand markets both at home and abroad, the Under Secretary reminded, and added that re-

serves of farm products stand as insurance against want when crops fail; security during periods of world tension; a shifting away from high cost production to more efficient farming and the opportunity to shift farm output to meet changing demand and new conditions.

That the population of the U. S. is increasing year after year was offered as an indication for greater agricultural markets. To meet these demands American agriculture must step up production. The net gain in population is one new person every 12 seconds, which means an increase of 68 pounds of beef and veal; 72 pounds of pork; 4 pounds of lamb and mutton; 186 quarts of milk and cream; 8 pounds of cheese; 17 pounds of condensed milk; 16 pounds of ice cream and 410 pounds of vegetables . . . every 12 seconds!

Farm production has tended to level off during the past five years and there is practically no new land to develop agriculturally. "Surpluses" may not pile up as rapidly as many now expect, he warned.

Regarding the cost-price squeeze on farmers, Mr. Morse declared that all of the agricultural industry must team up to maintain farm prosperity. "The fertilizer industry is among those businesses making a major contribution to profitable farming", he said. "It will continue to make possible further increases in the output of crop and pasture lands to help insure the solid future for agriculture."

Although broader use of fertilizer will cut down unit costs of food production, yet it alone cannot insure high and profitable yields. He called on the fertilizer trade to promote good farming practices, including control of insect pests and plant disease, correct timing of planting, good drainage and the introduction of irrigation where needed.

A report on "New Management in Washington" was brought by Hon. Charles A. Helleck, Majority Leader in the House of Representatives. He declared that President Eisenhower is dealing realistically with the tax problem and some relief may be felt in 1954 in some tax categories. Regarding defense ap-

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AGRICULTURAL CHEMICALS

propriations, Mr. Halleck said that the President is best qualified to judge between conflicting views on this question and the country should have a well-balanced defense machine soon. On the question of economy, the speaker declared that both Congress and the Administration are caught in a cross-fire between those who want lower taxes and others who insist that the excessive spending programs of previous administrations be continued. However, the policy now is to cut government costs; balance the budget and lower taxes . . . in that order. Public support is imperative in all these categories, particularly that of cutting costs.

The new administration is trying to proceed solidly and carefully in its legislative program, Mr. Halleck asserted. He assured his listeners that it is "not going to operate under a system of false alarms, artificial crises and smoke screens of manufactured confusion", but that it is intent upon making the American Way work, as never before, toward the constant improvement of our own standard of living and that of free men everywhere."

Fertilizer Use Panel

WITH Roy Battles, Assistant to the Master of The National Grange as moderator, a second panel appeared on Wednesday to discuss "Proper Use of More Fertilizer." Panel members were Milton C. Cummings, President, Farmers and Merchants State Bank, Effingham, Kansas; Werner L. Nelson, in charge, Soil Fertility Research, School of Agriculture, N. Carolina State College, Raleigh; O. J. Kelley, Head of the Division of Soil Management, Irrigated and Dry-Land Regions, U.S.-D.A., Beltsville, Md.; and W. F. Price, Plant Food Division, Swift & Co., Chicago, Ill.

In his introduction of the subject, Mr. Battles emphasized the fact that the United States are in a period of "vast change", and agriculture must be encouraged and helped to keep up with its new responsibilities. He pointed out the trend away from the farm which means, he said,

that fewer people will have to produce more food for increasing numbers in urban areas.

Mr. Price commented that fertilizer salesmanship has not kept pace with our facilities for increasing production and technology. "Those in business who have become accustomed to a sellers' market may be in for a liberal education", he observed.

Mr. Cummings raised the question of how the fertilizer industry can sell twice as much in 1955 without first "selling" the bankers on the value of fertilizer. He pointed out that sellers of hybrid seed have long since established their value with loaning agencies and have experienced

tremendous success in this regard. The fertilizer industry must follow suit . . . it's a problem too long overlooked by the trade.

The moderator brought up the question of responsibility in educating dealers. "Whose job is it?", he asked. Mr. Nelson replied that Land Grant Colleges have done some work in this line, and meetings of dealers have gone a long way toward teaching the fundamentals. Various manufacturers provide bulletins, recommendations, posters, etc. for the use of dealers.

Mr. Cummings, continuing the discussion on more emphasis on sales, declared that in his State of Kansas, the use of fertilizer could be multiplied many times before reaching its optimum.

Mr. Kelley observed that there is need for more research in soil analysis so that proper amounts of plant food may be added accordingly. The determination of phosphorus in the soil is particularly difficult, he said, since there is such a wide variation in different sections. Mr. Cummings told how his bank instructs farmers to bring in soil samples for testing; and how instructive pamphlets were sent out to describe the exact procedure. Nearly all the farmers in the county did this, with the result that crop yields were increased through application of correct analyses of plant food.

It was pointed out how publicity can be used to an advantage in this regard. "The farmer must be informed about how fertilizer pays", Mr. Cummings noted, and went on to describe how newspapers, radio, schools, and other local media were brought into play.

Mr. Price added that the job of education belongs to industry, too. He urged industry people to give to local editors case histories of success stories so that others might become interested too.

Mr. Kelley reminded the group that new markets are constantly coming along for the fertilizer industry. In the western states, for instance, from four to six million acres are being used as mountain meadows. Most

Re-Elected Directors-At-Large

E. A. Geoghegan—Southern Cotton Oil Company, New Orleans, La.
Russell Coleman—The National Fertilizer Association, Washington, D. C.
J. E. Nunnally—Cotton Producers Association, Atlanta, Ga.

Newly Elected Directors-At-Large

W. J. Murphy—American Potash & Chemical Corporation, New York, N. Y.
Hugo Riemer—Nitrogen Division, Allied Chemical & Dye Corporation, New York, N. Y.
Marlin Geiger—Davison Chemical Corporation, Baltimore, Md.

Elected To District Directorships

District 2

L. Graham Campbell—Chamberlin & Barclay, Inc., Cranbury, N. J.

District 3

R. D. Martenet—E. Rauh & Sons Fertilizer Company, Indianapolis, Ind.

District 4

Elbert N. Carvel—Valliant Fertilizer Company, Laurel, Del.

District 6

R. L. King—Georgia Fertilizer Company, Valdosta, Ga.

District 7

H. B. Fultz—Hector Supply Company, Miami, Fla.

District 8

T. W. Allen—Sand Mountain Fertilizer Company, Attalla, Ala.

District 9

C. D. Shallenberger—Shreveport Fertilizer Works, Shreveport, La.

District 11

George F. Wilkins—Gates Bros., Inc., Wendell, Idaho.

District 4

W. A. Watmough, Jr.—Davison Chemical Corporation, Baltimore, Md.

(Mr. Watmough will fill the unexpired term of A. W. Weaver, Norfolk, Va.)

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of this land has never been fertilized and offers an immense potential.

Fertilization in the fall of the year has proved effective in a number of states, it was reported. Iowa and North Carolina were cited as areas where it has proved successful. Fall application is especially successful in areas of small winter rainfall which results in a minimum of leaching.

Returning for awhile to the matter of salesmanship, Mr. Cummings told about efforts being made in Kansas to promote better practices, including fertilizer use. Through organizing by neighborhoods; including the bankers, manufacturers, county agents, farmers and local clubs, they have arrived at "The most effective selling method ever devised", as Mr. Cummings put it. A ten-year campaign to rebuild the soil is under way and shows every evidence of succeeding.

At the same time, he reminded, the fertilizer industry is faced with selling greater quantities of plant food to farmers who face declining prices for their produce. Plant food must be regarded as an annual investment rather than an incidental expense. The potential is tremendous, with farmers using only about 10% of what would be profitable; and of the total number of farmers in the U. S., only about half use commercial fertilizer at all, it was pointed out.

In the final address of the convention, Hugh M. Comer, president, Avondale Mills, Sylacauga, Alabama, gave the conventioners a view of "The New South" which he declared is experiencing a tremendous upsurge. He pointed out that in every way, industrially, agriculturally and socially, the south is moving to the front and today has "the best chance of any place in the world" to succeed.

Agriculture, he said, has undergone a veritable revolution during the past few years, with the widespread use of power machinery to replace animals; increasing and wiser use of fertilizers; irrigation; control of plant disease and insects in many crops; and better marketing facilities.

Cotton is being forced by the need of greater production, to mech-

anize and to use more agricultural chemicals. "Cotton growers are using more and better fertilizers and pesticides", he said, and added that very largely, the "guess" is removed from farming and is replaced by specific scientific knowledge.

Realization of what an enemy growers have in erosion has spurred widespread efforts throughout the south to correct the general situation. Erosion is caused by lack of action on the part of growers, he said, and this is being recognized by many who recognize that the basis of the entire economy is in the soil.

Mr. Comer enumerated some of the problems being attacked through research in the south and declared that chemistry is the cornerstone of agricultural development throughout that area. "There will always be frontiers where open minds and willing hands abound", Mr. Comer asserted, "and research will continue to open up new horizons." He added that research has no fear

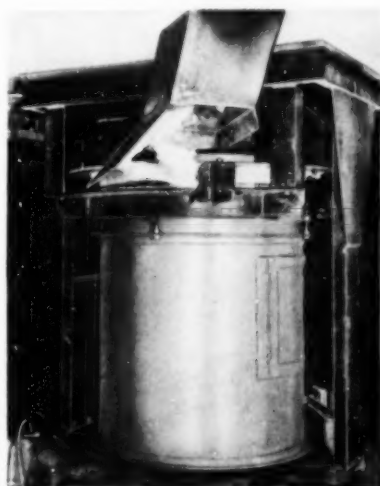
of obsolescence, but that research makes obsolescence.

FERTILIZER OUTLOOK

(Continued from Page 35)

Fertilizer Lowers Costs

EVEN if this lowered demand should not develop, such a program is still worth while. And why not? There are the best of reasons for continually promoting our product. The farm industry has made great technical advances during recent years. The farmer today is not so likely to talk of the number of acres in grain or other products, but you will most often hear him mention the figure of bushels per acre of which he is proud. Rising labor costs have made it imperative for him to learn how to get the greatest volume of crops by tilling the fewest acres with the least labor. The product of our fertilizer plants should be given much of the credit for lessened number of workers required on the farms during



An installation of the COM-BIN in a large chemical fertilizer plant. This feeder is handling the product directly from centrifuges, and has two plows discharging to points 180° apart. It serves a dual purpose as a surge bin and a feeder, taking an intermittent flow and uniformly discharging the product in equal streams to two rotary dryers.

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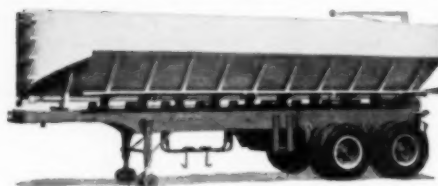
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recent years of record farm production.

It is estimated that our national farm income this year will be \$13.3 billion which is a drop of 5 percent below 1951.

While it is true that volume of fertilizer sales usually follows the trend of farm income, it must be admitted that there are changed conditions today and while in general the trend may be the same, the extent of drop in quantity of fertilizer used by the farmers with lessened income will not parallel that of the 1920-40 years. Certainly that should not be the case. The farmer faced with lower sales realization for his production and with higher operating costs should turn to ways of lowering his unit cost of production.

During recent years and especially during the last decade, he has learned more about the efficacy of using more plant food. The farmer each year has become more conscious of the value of fertilizer. There has also been improvement in the caliber of farm managers and the average size of farm has been increased. The impact of the organized educational endeavors by the State Experiment Stations with the system of County Agents, also the work of the many fertilizer manufacturers, the efforts of our own trade association and other such agencies have taken hold and

farmers have today more knowledge of fertilizer usage than ever before. It has been a campaign of steadily increasing intensity and today more is being done to guide the farmer toward more efficient use of commercial plant nutrients than ever before.

Ours is definitely a growth industry. More and more plant food can be used profitably. Forty-eight state colleges and the USDA have proven it and constantly preach it. If farmers used the amounts of fertilizer recommended by their colleges, current fertilizer expansion wouldn't be able to supply the market. Further, our colleges have shown conclusively that the individual farmer in hard times can protect his competitive position and his income by stepping up yields and cutting unit costs through fertilizer usage. We can be justly proud of the contribution the NFA has made in developing and publicizing this concept.

The major problem with which the industry is faced is to present the facts on the economies of fertilizer use conservatively, authoritatively, and, above all, convincingly. No farmer understanding the true situation will fail to preserve or increase his income when the opportunity is presented to him.

However, even if he understands the situation, many farmers may find themselves financially unable to purchase the fertilizers they need.

\$700 million worth of additional fertilizers which will come from current expansion can be used by farmers only if they have an additional \$700 million of working capital. Actually, their working capital may, under current conditions, be shrinking. So it is a fair guess that farmers will have to find this \$700 million from outside sources. Some will have to be provided by our financial institutions and this is the principal reason that the NFA has put so much emphasis on supplying bankers with economic information about fertilizer usage.

These facts today make it abundantly clear that this industry can continue to prosper only if the total fertilizer market is expanded. By expanding it we do ourselves, our customers and our country a favor. The question which faces us is whether we are going to be content to sit idly by and watch a shrinking market and then scrap over slices of a smaller pie, or whether we are going to do a real job of expanding the size of the pie. I submit that the time has come for us to put a major effort into realizing this market potential that has been predicted. We have thousands of agriculturists, public and private, bankers, dealers, conservationists, and civic organizations on our side. Combining their efforts with ours the job can be done.

Summarizing, it is a big job. However, we have as assurances on

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the positive side, there will be continued technological progress in farming, there will be increased population in the country and continued trend toward a higher standard of living.

Also, here let me appeal to the newcomers in our industry — the large chemical companies and others who have recently come into the business. This plant food sales promotion is a huge undertaking almost without limit, and we need aggressive selling on the part of all if our market growth is to keep abreast of this plant expansion.

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CONDITIONERS

(Continued from Page 50)

cluster of Eastern States F_1 tomato at intervals as recommended by Wittwer and Schmidt.⁵

For control of early and late blights of tomato the plants were sprayed with "Dithane Z-78" (zinc ethylene bisdithiocarbamate) every 10 days or after each rain, beginning soon after first fruit set. As soon as early blight appeared on the lower leaves touching the ground, they were removed and burned. These two measures prevented any serious development of either kind of blight. Insects were controlled by dusting with 5 percent DDT every 2 weeks or after each rain.

Severe drought and high temperatures during the last 3 weeks of July were ended by excessive rains

and temperatures were lower during the first 2 weeks of August.

Results

THE three synthetic soil conditioners evidently stabilized the soil aggregates in Sassafras silt loam for the entire growing season. This retention of good tilth was reflected in the rapid growth of the vegetable plants. Lettuce and tomato plants showed the most favorable response in the flats by transplanting time.

Proper application of conditioners caused no puddling and permitted the water and fertilizer solutions to penetrate the soil rapidly. Liquids penetrated slowly or washed off the nonconditioned soil. The surface of the conditioned soils always dried out more rapidly than that of the controls after each rain or watering. The nonconditioned soil remained wet and sticky longer and became rather compact and hard to cultivate.

At the end of the season, stabilized aggregates were still noticeable on the surface of conditioned soil

while the surface structure of the nonconditioned soil was poor. The conditioned soil had also become darker than the nonconditioned. Removal of tomato roots from conditioned soil for measurement was also considerably easier than from nonconditioned.

Treatment with "Krilium No. 6" caused early lettuce, broccoli, cabbage, and tomatoes to reach harvest stage significantly earlier than the controls. This advantage was doubtless due in part to the larger sizes of transplants from the respective treated flats. Control plants later became as productive as those grown in conditioned hills. The treatment also caused significantly higher midseason yields of Eastern States F_1 tomato fruit, but there were no significant differences in early yield among rates of application of conditioner from 1/10 part per thousand parts of soil upward. The favorable early and mid-season yield from the lowest rate was probably due in part to the initial advantage in size and vigor of plants

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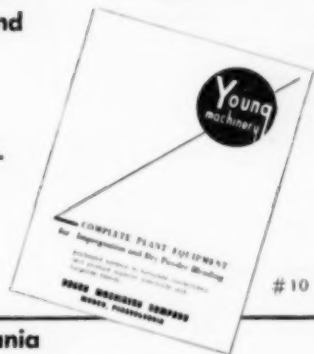


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⁵Wittwer, S. H. and W. A. Schmidt. Further investigations of the effects of "hormone" sprays on the response of outdoor tomatoes. Amer. Soc. Hort. Sci. Proc. 55:335-342, 1950.

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Chemistry and Uses of Insecticides

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Written by an outstanding student of entomology and agricultural technology, this book covers all the major insecticidal agents in detail, describing not only their chemical nature and properties, but also their specific action on various types of insects, their methods of application, and their effect on animals and humans.

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at transplanting time. Each of these larger plants was transplanted with a 3-inch cube of soil conditioned with "Krilium No. 6" at 1 part per thousand parts of soil. At midseason the $\frac{1}{2}$ part and 2 parts per thousand rates of soil conditioner gave significantly more productive plants than the 1/10 part per thousand rate. There was no significant difference in yield of plants in soil treated at the $\frac{1}{2}$ part and 1 part per thousand rates. When considered statistically, the 2 parts per thousand rate was significantly more productive than the 1 part at the 5-percent level but not at the 1-percent level.

The fresh weight of Eastern States F₁ tomato roots recovered from all treated plots was significantly higher than that of roots receiving no conditioner. The treatments at $\frac{1}{2}$ part, 1 part, and 2 parts per thousand all yielded greater weights of roots than the 1/10 part per thousand, but only the heaviest treatment caused a significant increase.

A late planting of Marglobe tomato responded favorably to the three soil conditioners when grown in flats for transplanting and also in the garden. The plants in each of the treated hills grew more vigorously, matured their crops earlier, and produced higher total yields than those in the controls. The three soil conditioners caused significant increases in early, late, and total fruit yields. They were equally effective.

The average fresh weight of roots recovered from conditioned hills was greater than that from nonconditioned hills, but "Krilium No. 9" was the only conditioner that caused a significant increase in fresh weight of recovered roots. These roots were also significantly heavier than those from plants grown in hills conditioned with "Krilium No. 6" or "Aerotil."

Summary

THIS paper reports the effects of "Krilium No. 6" on growth and yield of early broccoli, cabbage, lettuce, and tomatoes; the effects of "Aerotil," "Krilium No. 6," and "Krilium No. 9" on yield of late tomatoes; and the visible effects of these conditioners on structure of

Sassafras silt loam. Plants for transplanting into treated soils were grown in flats of treated soil. Control plots were transplanted with plants grown in flats of nontreated soil.

These synthetic soil conditioners proved practical and economical for use in potting soil and for hill placement in home garden plots.

"Krilium No. 6", "Krilium No. 9", and "Aerotil" maintained a granular porous structure in a Sassafras silt loam soil throughout the entire growing season. This desirable structure was lacking in nonconditioned soil. The treatments increased rapidity of absorption of water and liquid fertilizers.

"Krilium No. 6" at the rate of 1 part per thousand parts of soil in plant-growing flats and in hills about 9½ inches in diameter (to a depth of approximately 6 inches) caused a significant increase in early yield of Early One broccoli, Pennlake lettuce,

and Golden Acre cabbage during a cool spring. In similar hills at rates of 1/10, $\frac{1}{2}$, 1, and 2 parts per thousand parts of soil (following growth of transplants in soil treated at 1 part per thousand), "Krilium No. 6" caused significant increase in early and midseason yields of Eastern States F₁ tomatoes grown as an early crop. No significant difference in total fruit yield resulted from any of the treatments.

Soil conditioning with "Krilium No. 6" also caused a significant increase in fresh weight of tomato roots recovered for measurement.

"Krilium No. 6", "Krilium No. 9" and "Aerotil" at the rate of 1 part per thousand parts of soil in the plant-growing flats and in 24-inch diameter hills caused significant increases in early, late, and total yields of Marglobe tomatoes grown as a late crop. These three materials appeared equally effective in these tests.

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Loeffler to FMC Post

Food Machinery and Chemical Corporation has announced the appointment of Alfred T. Loeffler as assistant vice-president of its Chemical Divisions. Mr. Loeffler becomes administrative assistant to Ernest Hart, executive vice-president of Chemical Divisions with headquarters in the Chemical Divisions Administrative Offices at New York.

Well known in the chemical industry, Mr. Loeffler was for a number of years associated with the Hooker Electrochemical Company, following which he joined Monsanto Chemical Company, becoming general branch manager in New York. In 1951 he became chief of the Chemical Branch of the Office of Price Stabilization in Washington. Returning to Monsanto, he was appointed director

of development of the Organic Chemicals Division at St. Louis.

A graduate in chemistry from the University of Rochester Mr. Loeffler is also a graduate of the Advanced Management Course, Harvard University School of Business Administration.

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Ohio Pesticide Tour, Ohio Agricultural Experiment Station, Wooster, August 12 to 14.

Connecticut Agricultural Experiment Station Annual Field Day, Experimental Farm, Mt. Carmel, Conn., August 19.

American Phytopathological Society (In connection with American Institute of Biological Sciences), University of Wisconsin, Madison, September 6-10.

American Chemical Society, Fall Meeting, Conrad Hilton Hotel, Chicago, Ill., September 6-11.

Twentieth Annual Fall Meeting, National Agricultural Chemicals Association, Essex and Sussex Hotel, Spring Lake, N. J., September 9, 10 & 11.

Association of Official Agricultural Chemists, Shoreham Hotel, Washington, D. C., October 12, 13 & 14.

Association of American Feed Control Officials, Shoreham Hotel, Washington, D. C., October 14 & 15.

Association of American Fertilizer Control Officials, Shoreham Hotel, Washington, D. C., October 16.

Association of Economic Poisons Control Officials, Shoreham Hotel, Washington, D. C., October 17.

Entomological Society of British Columbia and Entomological Society of Canada, Empress Hotel, Victoria, B. C., Oct. 19-21.

First International Congress for Plant Protection, University of Naples, Portici, October 19-23.

Fertilizer Safety Section, National Safety Council, Chicago, Ill., October 21.

Second Annual Meeting of the Entomological Society of Canada jointly with the Entomological Society of Quebec, Quebec City, Oct. 29-31.

Thirtieth Annual Convention, California Fertilizer Association, Carmel-By-The-Sea, Calif., November 9 & 10.

Sixth Annual Pesticide Application Equipment Conference jointly with 15th Annual New York State Insecticide-Fungicide Conference, Bibbins Hall, GLF, Ithaca, N. Y., November 10-12.

Chemical Specialties Manufacturers' Association, Inc., 40th annual meeting, Mayflower Hotel, Washington, D. C., December 6-8.

Entomological Society of America, Biltmore Hotel, Los Angeles, Calif., December 7-10.

Illinois Custom Spray Operators' Training School, University of Illinois, Urbana, January 21-22, 1954.

MIXTURES

(Continued from Page 33)

timing for optimum control of soil insect pests. Would fertilizer application be made at the exact time that the insecticide contained in it can do the most good? Many believe that this question is one of major importance, but of such complicated nature that it would be impossible to carry complete information on labels to cover all the situations likely to come up. In considering this, it should be remembered that farmers are notorious for failing to read and heed labels and other instructions which in the case of fertilizer-pesticide mixtures, could bring about disastrous results to certain crops. Fertilizer users are particularly unaccustomed to reading instructions, since the material has been used in about the same way for generations and the farmer sees little point in studying "all of that fine print". Regulatory people on both the state and Federal level, will be helpful in urging users to pay attention to detailed instructions.

Yet, despite all the potential headaches and pitfalls involved in the mixing of fertilizer and pesticidal materials, growers seem determined to obtain such products. Safety in their use is a matter for the individual involved, to a large extent, although

State and Federal regulatory agencies have issued numerous rules to govern such things. Already some states have passed laws to ban the mixing of pesticides with fertilizer.

With this as a background, it remains a matter of conjecture just how far the "tide" will move ahead, but many thoughtful persons in the trade have expressed the opinion that if insecticides are mixed with fertilizers successfully, then the next step will be to include herbicides in plant food mixtures. Demand for such is bound to come sooner or later and the industry should be thinking of how to solve the problems which are sure to come up with such an idea.

The basic problem seems to be how to regulate effectively the movement of such combinations without halting progress with too many legal barriers. How much control is needed? This is another rather delicate question which must be solved eventually, with much open-mindedness on all sides.

Modern agricultural methods make necessary certain changes in old practices. The corn crop, for instance, accounts for nearly 25% of total fertilizer consumption in the U. S. Pesticides, mixed in fertilizer applied on corn, could be of great value in controlling corn root worm and other serious soil pests. These pests are of increasing importance in view of current practices of planting corn year after year in the midwest, without rotation with other crops. This offers no chance for the rootworm to reduce in population in off years when corn is not planted on a given field, and appears to many to be a natural for use of fertilizer and insecticide mixtures.

The final answer lies in the action to be taken by growers in demanding such combinations; the attitude of mixers toward the obvious risks and extra work involved; and the colleges in making recommendations for or against the idea.

At least, it is a trend well worth watching and hundreds in both the pesticide and fertilizer trades are keeping a weather eye on developments.★★

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(The Advertisers' Index has been checked carefully but no responsibility can be assumed for any omission)

Tale Ends

GUESTS at the big reception sponsored by Potash Co. of America, at the recent APFC convention at the Homestead, were treated to a little unscheduled entertainment just preceding the banquet Saturday

night. It seems that the head waiter, in giving out instructions to his scores of waiters, was telling them what was what in regard to the banquet service. "Now ah want you to be at your stations at exactly eight o'clock", he

boomed in his best sergeant's voice. "And tonight we won't stand for no monkey business. The menu is going to be . . ." and he proceeded to name off the entire bill of fare in proper order.

Punctuated with expressions not usually expected to reach the sensitive ears of hotel guests . . . particularly lady guests, the impromptu address had people at the party looking at each other in wonderment. "Is this a gag of some kind?" they asked.

It wasn't a gag. The "sergeant" headwaiter was addressing his crew on a kitchen microphone which he obviously didn't know was connected to the loud speaker in the dining room. Now the guests know what lies back of prompt and apparently effortless service at places like the Homestead.

* * *

The NFA'S "Fertilizer News" for May 29 appeared in mimeographed form because of a strike of printers at the plant where the bulletin is ordinarily published. NFA members were thus kept up to date on information usually carried in the "News."

* * *

Dean A. Bussart, son of Dr. J. Everett Bussart, Velsicol Corp., Chicago, sailed for Korea on June 17. The boy is a Second Lieutenant in the Quartermasters Corps.

* * *

Dr. H. B. Mann, president of the American Potash Institute, Washington, D. C. was recently elected to the board of trustees of The University of North Carolina. Dr. Mann indicates that the position is one sought by many and he takes justifiable pride in having been selected.

* * *

Another proud gentleman in the agricultural chemical trade is Paul Mayfield, Hercules Powder Co., Wilmington, Del. and vice-president of the National Agricultural Chemicals Association. Paul only recently became a grandfather, and the buttons are popping all over northern Delaware! (It's a grandson).

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SPITTLEBUG CONTROL PAYS OFF IN BETTER HAY YIELDS

Tests conducted by state agricultural colleges, and reports from growers of alfalfa and clover show that spittlebug control with toxaphene insecticides pays off. Hay increases of 30% to 35% over untreated fields are common. The hay undamaged by spittlebugs is more nutritious, easier to cure. Only one toxaphene application usually is needed.

Prompt treatment is necessary, however, to kill the young spittlebugs before they can build up into damaging numbers. In late April and early May, fields should be inspected carefully. When the first frothy white masses are noticed, toxaphene should be applied at the recommended rate. Farmers are advised to get an adequate supply of toxaphene insecticides in their barns now, and to have equipment ready so the insects can be killed before they have a chance to stunt the young plants.

How Hercules Helps You Sell Toxaphene

LEGUME GROWERS in the East and Middle West see Hercules advertisements like this in farm papers when spittlebug infestations are expected. Toxaphene dusts and sprays control many other insects that attack seed, cereal, and forage crops.

The alfalfa at the top of the photo, taken from a Pennsylvania field last year, was sprayed once when it was two inches high with a toxaphene formulation at the rate of 1.5 lbs. of technical material per acre. The lower sample was untreated. It suffered severe insect damage although it grew only 100 yards from the well-developed, toxaphene-treated alfalfa.



Spittlebug control can reward the farmer with big yields. Even in heavily infested spittlebug areas, like this fine farm in central Ohio, toxaphene-treated fields have gone practically undamaged by spittlebugs and other forage crop insect pests.



The alfalfa in this New Jersey field was not treated with toxaphene insecticide. Plants did not develop naturally, were stunted and unattractive as forage because of severe insect attacks suffered early in their growth.



Proof that spittlebug control with toxaphene pays in increased tonnage, more nutritious hay. This plot, in the same field as the one on the left, was sprayed late in April with one application of toxaphene insecticide.



The spittlebug nymph (lower right) stunts alfalfa as it feeds in the protective spittle masses. It draws sap from the tender young plants, depriving them of nourishment essential to growth. Kill nymphs early in the season by applying toxaphene insecticides.



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970 King St., Wilmington 99, Del.

TOXAPHENE dusts · sprays

SEE THE SPITTLEBUG MOVIE

"The Spittlebug and Its Control," a 16 mm. sound movie in full color, was made in alfalfa fields last spring during the height of the spittlebug infestation. Be sure to see this helpful film. It is available for showing through your county agent. Ask him when it will be shown in your community.